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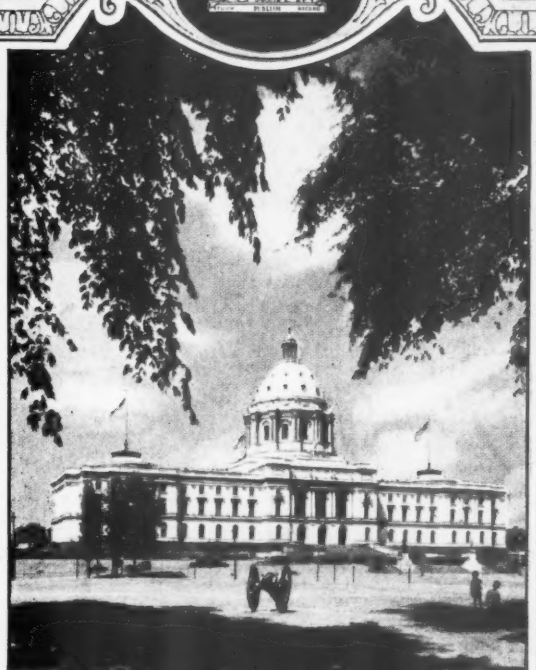

St. Paul, Minn.
August 6-10

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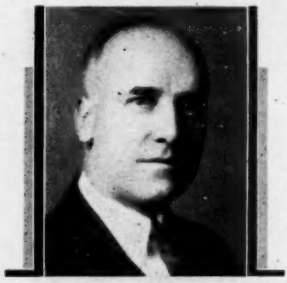

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Seventy-Sixth Annual Session of the American Dental Association
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THE JOURNAL
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Vol. 21 JULY, 1934 No. 7

Original Communications

RELATION OF MINOR ORAL SURGERY TO THE FIELD OF MEDICINE*

By FRANK J. BERNARD, D.D.S., Chicago, Ill.

THE extraction of teeth has been carried on among the human races for centuries, and although it is considered a minor surgical procedure, we are rapidly coming to understand the operation as one of the most significant that are known in the entire field of medicine today. There is no doubt that practitioners of oral surgery have developed a technic for the removal of teeth to such a high degree that the laity as well as the medical and the dental professions think of such operations as simple and without hazard. The general opinion would probably be materially changed if we were to suddenly discontinue the specialty and revert to the customs of times when general practitioners of medicine and dentistry, and even the barbers, attempted the removal of teeth under all sorts of conditions with little or no consideration of aseptic surgery. Please understand that I do not minimize the surgical ability of many general practitioners of the healing art, but I do believe the pace has been set and the standard of work has been continuously raised by the men who have limited their work to the field of minor oral surgery.

We have gradually come to face a new responsibility, which must be met if dental surgery is to continue its progress, and if dentistry is to take its rightful place in the program of science and medicine. This new problem has to do with the diagnosing of local and general diseases from oral findings. Frankly, the time is at hand when the dentist must look a bit farther than the pathologic process around the teeth, for he must evaluate his observations in terms of the preservation of the patient's health. I, therefore, invite your attention to some

*Read at the Seventieth Annual Midwinter Clinic of the Chicago Dental Society, March 1, 1934.

of the dental conditions which may arise from constitutional diseases and then shall discuss the conditions which call for simple extraction as well as those requiring surgical removal, concluding with the general description of the end-results of both procedures.

The oft-repeated statement, "The laity are becoming dental minded," should be referred to as the old and worn-out statement because the laity *have* become "dental minded" and are, I fear, ahead of the dentist in the parade of progress.

More and more, patients look to the dentist as a diagnostician, at least, as far as oral disease is concerned. It is not at all uncommon nowadays for a patient suffering with rheumatism to go to the dentist before he visits a physician, because he has been taught that such conditions may be due to dental infections.

A few years ago, I fear, the patient would have suddenly found himself edentulous, and with all sorts of promises of recovery from his rheumatism. Time and experience have taught us that the suffering patient might have really experienced little if any change in health even after all of the teeth had been removed. Such instances are looked back on as a scientific error, but those are the very cases which challenge the dental profession for more accurate diagnoses.

Nowadays, the dental surgeon observes the general condition of the patient and examines the mouth for definite signs of oral disease and frank infection around the teeth. If such infection is found, the affected or infecting teeth are removed, but no grand promises of recovery are made concerning the systemic condition. As a matter of fact, we now know that there are several types of rheumatism, only one of which is due to infection. We should not lose sight of the fact that in all constitutional disease, the general resistance of the patient should be raised as high as possible, and the elimination of any existing focal infection will assist in accomplishing this; but as for the dental condition being the primary cause of rheumatic conditions, we realize that this is still questionable and that all prognoses should be guarded.

When an infection starts in any part of the body, nature usually develops a barrier around it. This is accomplished by means of a great many processes, but the end-result is the formation of a wall around the area of infection, which tends to limit the process and prevent the dispersion of bacteria and their poisons (toxins). Did you ever stop to think of such a limiting wall as a friend of your patients and of yourself? If so, why break it down or scrape it out, unless there is definite reason for such curetting? There is no doubt that many lives have been saved by the discontinuance of routine curetting of all sockets at the time of extraction. Obviously, there are occasions when a curet should be used, as for the removal of a definite granuloma or cyst; but there are also occasions when curetting a socket is very dangerous, as in a subacute abscess, in which the patient's resistance has had all it could do to build a wall.

The latter conditions must be diagnosed and allowed to remain undisturbed. We should also visualize that certain infections cannot help being scattered during the process of extraction, regardless of the care used in the procedure. The many processes which make up the general resisting forces of the body are called on to dispose of the dispersed bacteria. What if the resistance of the patient is not equal to this? A toxemia or septicemia of general character will result. Not infrequently, we are called on to operate on a patient whose resistance is at low ebb, and in whose mouth

we find many infected teeth. We may either estimate the resistance of the patient or ask for a blood count, which will be definite.

Obviously, the oral surgeon is now expected to evaluate these findings in terms of resistance and remove the two, three or four teeth that he knows the patient reacts to, instead of overwhelming the patient by the removal of too many teeth at one time. It requires three or four days for the antibodies in the blood to control infections of this character and develop an additional group for protection from subsequent infections. The appointments for operative work should, therefore, be several days apart.

There are certain pathogenic bacteria which do not cause the formation of antibodies in the blood. One of these groups are Vincent's organisms. The careful surgeon will, therefore, refuse to extract teeth in the presence of an acute Vincent's infection, but will direct his attention to the control of the infection before extraction is attempted. Even puncturing the pharyngeal wall in the presence of an acute Vincent's infection may, and frequently does, result in abscess of the lung.

Permit me to describe an experience of a friend in this connection. A patient visited his office to have his teeth extracted. Examination of the mouth revealed an acute Vincent's infection. Although the patient insisted on the extraction of all of his teeth because of the pain, the dentist frankly refused to extract them until the infection was under control, explaining in detail the reasons for his refusal. The patient would not listen, but left the office to seek other advice, or rather to find some one who would extract the teeth for him. Three days later, the patient was reported dead. He had found a dentist who did as he wanted. An acute septic condition developed which resulted in his death. Invasion of the blood stream by a group of organisms against which the body could not build up a resistance, and in such overwhelming numbers, did not give the system a fighting chance.

Vincent's infection which is superimposed upon hypertrophy of the gums calls for a more thorough study of the general condition of the patient before the teeth are removed. It is by no means uncommon for this type of infection to attack the gums of patients suffering from any of the acute blood diseases, particularly the leukemias and agranulocytic angina.

The patient usually gives a history of recurrent attacks of pyorrhea, which have improved with, or without, treatment, but he will go on to say that, at the present time, there is more pain and pus around the teeth than ever before. This is due to the fact that leukemic conditions tend to run in cycles of improvement and recurrence of symptoms. As the disease becomes greatly aggravated, the resistance of the body is lowered and Vincent's infection develops. To extract teeth under such a condition merely adds to the load of infection carried by an unresistive body, hastening the death of the patient.

A differential blood count will reveal the positive diagnosis of such a condition, and any reliable laboratory organization can interpret the blood findings.

The time has come when dentists should make use of the facilities of the pathologic laboratory, just as physicians and we as oral diagnosticians must resort to such findings if we are to assume the responsibility facing us now.

All of us who have practiced for any length of time have extracted teeth for patients suffering with diabetes and, as we say, "have gotten by with it." This merely proves that nature is very kind to us at times. The fact probably is that

we *think* we were successful. The postoperative bleeding was undoubtedly markedly prolonged and healing was extremely slow. Klug calls attention to the almost constant finding of a greenish black serumal deposit on the teeth of diabetic patients. He states that he frequently makes positive diagnoses of this disease by this symptom alone.

Recovery is materially hastened after extraction in such patients if we operate during the so-called sugar-free periods. Such patients should be directed to have their physician care for them until the test for sugar in the urine is negative and then return for the extraction. Obviously, the emergency requires that we take a chance, but, in such cases, we must expect complications, and the patient should be informed of it.

Swelling of all types calls for thorough study, even though a tentative diagnosis of abscess or benign tumor has been made. Remember, it is the surgeon who assumes the responsibility, and it is his duty to know what condition he is dealing with. One authority on malignant disease advises a biopsy in all cases of loose, sore or aching teeth, before extraction. It is obvious that from a practical standpoint such a procedure is impossible.

Malignant tumors within the mouth are rare as compared with the other groups of pathologic lesions. We should bear in mind, however, that 4 per cent of the malignancies occur in the oral cavity and a thorough study of all swellings, large and small, even to the extent of an occasional biopsy, should be made before teeth are extracted.

The men who specialize in the treatment of malignant disease do not worry so much about the simple removal of a tooth from a tumor mass as they do about the infection which almost always occurs, and although the process of extracting such teeth does aggravate the condition, the procedure almost invariably complicates treatment. Certain authorities state that infection in malignant tissues decreases the possibility of cure by 50 per cent. That is to say, a malignant condition which carries a 50 per cent mortality when properly treated will, when infected, be reduced to a 25 per cent chance of cure. When removal of a tooth from an area of tumefaction becomes necessary, and it is learned that the tumor has persisted for weeks and has been slow in growth, and the patient has suffered a loss in weight, a small piece of tissue should be taken for a biopsy examination before surgical measures are taken.

There has been a great deal of discussion concerning the advisability of extracting teeth in the presence of an acute alveolar abscess with tumefaction. As a rule, the best results are obtained by care of the abscess first and the removal of the teeth at a later date. There is no doubt that a great many deaths have occurred from the untimely removal of infected teeth.

One condition which I do want to emphasize is the infection and subsequent abscess formation in the pterygoid triangle. We are fortunate in that this is a rare complication, but it seems to occur in just those cases in which we are most careful. If a friend or a relative of an associate comes in for an extraction, this complication is very apt to develop. At least, that has been my experience. Because the area affected is immediately posterior to the point of a mandibular injection, this condition has been attributed to faulty technic in the handling of this block injection. The truth is that infection around the lower third molar and the distal portion of the lower second molar tends to drain or perhaps extend into this so-called triangle.

The symptoms, which usually start from forty-eight to seventy-two hours after the removal of the teeth, are characterized by a gradually increasing soreness of the throat, not infrequently diagnosed as tonsillitis. There is a gradual rise in temperature to 102.5, or, occasionally, 105; a pulse of 110, 120 or even 130, and respirations as high as 34, 36 or 38.

Within an additional twenty-four or thirty-six hours, there is a marked swelling in the throat, but no signs of a localization at the usual site of a paratonsillar abscess; namely, in the soft palate region. Occasionally, the patient will have a sensation of gagging and marked pain on swallowing. The submaxillary triangle may become involved, and without surgical interference, and provided the resistance is high, the abscess will rupture into the throat, usually about the third or fourth day. If the resistance is low, the patient will become toxic and develop symptoms of an acute neck infection via the submaxillary region, followed by a pneumonia of bronchial character.

This condition is by no means due to any mismanagement by the dentist. One of our oral surgeons recently handled such a case, in which the lower third molar became so loose that the patient picked it out with his fingers.

The treatment for this condition consists of applying hot fomentations to the side of the head and neck over the areas involved and frequent irrigation of the throat with a physiologic sodium chlorid solution or a lukewarm alkaline antiseptic solution. Large quantities of fluids are given. As soon as there is fluctuation, an opening should be made through the anterior pillar. An incision is made just mediad from and parallel with the anterior border of the ramus of the mandible. This incision should not be deep, merely passing through the superficial tissues. Then, with a curved hemostat, the incision is carried through the pterygomandibular fascia. A rubber or guttapercha drain may be employed, and perhaps sutured in place. Hot fomentations should be continued until suppuration has stopped. In the event of an infection of the neck, drainage will have to be accomplished by dissection and opening up the tissue planes involved.

Strips of gauze make poor drains. They are more nearly packs, especially when they become loaded with wound secretions. I use guttapercha, rubber, rubber tubes and cigaret drains in all of my work. In an emergency, a rubber glove may be sterilized and strips cut from it may be rolled and used for drains.

From a constitutional standpoint, an important factor in the treatment of infections is elimination. The oral surgeon pays too little attention to this problem. We should bear in mind that the better the elimination of toxic products, the greater the advantage over the infections. Patients frequently state there is no reason for the use of enemas or carthartics because they have been unable to eat for several days. The fact is that when they do not take food, the physiologic processes of the body are decreased and poisons tend to be stored in the system. This is the very time that they should receive cathartics or eliminative drugs and also fluids.

In general surgery, they know that 5 or 6 per cent glucose solutions tend to combine with toxic products and wash out the body. This may be given in the form of glucose in saline solutions under the skin, by rectum, or it may be administered in the form of fruit juices and carbonated waters by mouth. One fact should be borne in mind: When these solutions are given by mouth over a period of several days, diarrhea not infre-

quently results. If such a condition does occur, the glucose solutions should be discontinued and the diet changed to a high intake of milk. The patient must get quantities of fluids in one form or another, and although complications arise, they may be counteracted merely by changing the type of fluids, without discontinuing them. There is but one condition which contraindicates the intake of large amounts of liquids; that is, heart decompensation, when the fluid intake must be limited in order to decrease the load.

We are also expected to interpret roentgen-ray findings and, frequently, at a gross disadvantage. A patient may come in with roentgenograms to be "read." These will, of course, show the teeth with such usual findings as fillings, overfilled or underfilled root canals, general alveolar absorption, remaining root fragments, cysts, etc.

Did it ever occur to you that the general alveolar absorption we so easily see and readily interpret is merely a part of a general disorder known as osteomalacia? When the cysts are not in contact with the roots of the teeth, and the adjoining teeth look normal, do you feel that a dental condition must be present and so condemn one or more of the teeth which are closest to the rarefied area, or are you honest with yourself and your patient, frankly saying, "I do not know"? You should have a head plate taken, and perhaps one or more views of the long bones also, because this is apt to be a constitutional disorder. It may pay us to be as cautious as the congressman, who, while riding on a train, looked out of a window at a flock of sheep. A companion remarked, "Those sheep have been sheared, haven't they?" The politician answered, "Yes, on this side."

Any disease which is associated with an imbalance of the salts of the body may result in osteomalacia, or thinning of bone, particularly around the central canals of the long bones, and also absorption of the alveolar process. Such conditions as Paget's disease, osteitis fibrosa cystica, and Schüller-Christian's disease may be associated with cysts in the alveolar process as well as the other bones of the body. No one should attempt to make a diagnosis of these conditions from dental films alone, but we are expected at least to think of them, and have no right to condemn a normal appearing tooth merely because it is in close proximity to a cyst of the jaw. If such a cyst happens to be in contact with a tooth which is removed, the chances are that the socket will remain open and sore for weeks and even months.

A patient had suffered with pain in a socket ever since the tooth had been removed, about two years previously. The condition was diagnosed later as Schüller-Christian's disease. As it is the custom of these patients to travel from one clinic to another, we too lost track of her, but I understand she is still suffering from the condition of the socket, which has not yet healed. You are, no doubt, wondering what we are to do with such a case when the teeth must be extracted. I feel that the patient's physician should assume some of the responsibility, and then take the chance. Therapy of both local and systemic character is far better than the merely local procedures which are available at the present time.

Many are the surgical procedures which have been used in the extraction of teeth. One of the earliest instruments accepted and used almost universally was the tripod elevator. Others were the turnkey, which we are all familiar with, and, the most novel means of extracting, the iron nail and the hammer, such as is employed by the mountain whites in Kentucky and Virginia. At the present

time, we are using the simple extraction method, supplemented occasionally by the use of the wing elevators. The most advanced procedure is so-called surgical removal. Both of the latter methods have their indications, as well, I believe, as their contraindications, and each has its characteristic way of healing.

I cannot conceive of one method being applicable to all cases or accepted as routine technic. For instance, why should any one expect a patient to submit to a procedure such as is required in the surgical removal of a tooth which presents no surrounding pathologic process, and which it is believed may definitely be removed by the use of the forceps without difficulty or complications?

We must also think of the general condition of the patient. A patient suffering from a toxic thyroid and decompensated heart comes in for the extraction of a few teeth, which we feel may be removed without difficulty by means of forceps. The majority of us not only advocate, but also practice, the simple extraction procedure in all cases of so-called simple removal without complications such as cysts.

On the other hand, there are those cases in which periapical disease must be eliminated and excementosed roots, fragments of roots, etc., removed; and, in these procedures, we employ either the true surgical removal technic or a modification of it. This may be a broad statement to many, but this surgical removal technic should be employed only by the men who have sterile supplies. How would you feel if you were to go to a surgeon's office for even a minor operation, and see him take the gauze which he intended to use on you from under an old newspaper, or out of a jug which had been open for weeks, and collecting the dust of the office?

Surgical removal of a tooth is an operation and should be given as careful consideration as to cleanliness and sterility as any major procedure. There is no excuse nowadays for an operator to assert that he is not acquainted with surgical care. Every college in the country has well-equipped rooms for minor surgical operations and the men in charge certainly do their best in training the student in surgical procedures.

The subject of local anesthesia has been fully discussed in dental meetings during the last decade; but permit me to call attention to the fact that if any solution is injected into an infected area, the infection is bound to be scattered into the surrounding tissues, and once it has been forced beyond the limiting wall of leukocytes, we might as well consider it as scattered throughout the entire body.

Another point of interest is that tissues may be torn by the rapid introduction of any solution, just as a number of sharp instruments may tear the tissues in different directions.

In using forceps, one of the weakest portions of the tooth is found at the cemento-enamel junction; therefore, the beaks of the forceps must remain below this junction, or neck of the tooth. To accomplish this, it usually becomes necessary to press the forceps down on the root until the tooth is loosened, and it is then a simple matter to pick the tooth out of the socket. During my teaching days, the undergraduate as well as the postgraduate student seemed invariably to forget this one important fact, and the end-result was always the same; a broken tooth with a root to be dug out. Another common finding was that the operator used too much force in gripping the forceps, and a crushed tooth was the result.

I not infrequently find that an operator has tried to elevate a tooth from a socket when all the adjoining teeth are in place. There are two ways of using

elevators. One is to pry the tooth, in the process of removing, into an adjoining space, or by forcing the blade of the elevator between the root and the wall of the socket, and thus use the alveolar process as the fulcrum of leverage. It is impractical and usually impossible to elevate a tooth by prying it against the one adjoining. Contiguous teeth have been broken off and jaws have been fractured by this error in technic.

After the tooth has been successfully removed, it is well to press the alveolar walls of the socket back into position and also to see that there is nothing in the socket. The sockets of the lower teeth make excellent receptacles for broken tooth fragments as well as fillings, and as they have to be taken out at some time, it might as well be as soon after extraction as possible.

There are a number of different methods used in surgical removal. All of these may be varied according to the extent and location of the pathologic process around the tooth. As a general plan, I never make the incision directly over the tooth to be removed. It is well to go mesially or distally from the midline of the adjoining tooth. It should be slightly curved, with the concavity toward the condemned tooth, and should extend upward and onto the gum for a distance equal to three-quarters the length of the root. The flap is then carefully raised from the bone, and held, retracted or sutured back out of the field of operation. The bone is chiseled away until the root and the pathologic tissues are exposed as desired. Removing the root at this time frequently opens up the field to the pathologic process, which may then be dealt with as desired.

All of this has now become a relatively standard procedure. After the required surgical work has been performed, the flap of soft tissue is replaced, being held in place with as few sutures as possible. Not infrequently, I find that one catgut or dermal suture well placed immediately above the gingival ligament, at the point of incision, will suffice. Too many sutures hinder the drainage of tissue juices and wound secretion, and because these fluids are often infected, it is well to allow them to drain.

There are several cases on record wherein patients have become septic and died because of lack of drainage. Some advocate that gauze packs be placed in these wounds. A drain may occasionally be of benefit, but unless a hemorrhage is to be controlled, the use of gauze packs cannot be advised.

In the postoperative care of all cases, the patients should be advised to use a mouthwash. There are certainly a great number to select from, and if we were to permit ourselves to be educated by the radio advertisers, I dare say each patient might receive different instructions. From research carried on in legitimate institutions, such as universities, we learn that the mechanical removal of débris and bacteria is the most important factor in a mouthwash. All solutions used in washing surgical wounds, regardless of whether they are in the mouth or on the leg, must be sterile, nonirritating, lukewarm, preferably, and nonpoisonous. The solutions which I find most desirable are physiologic sodium chloride and alkaline antiseptic. Obviously, others may be used by the dentist in the office for postoperative cases, such as 2 per cent iodine, 4 to 6 per cent potassium chlorate, or one-five thousandths potassium permanganate solutions, but, as a rule, the milder solutions serve admirably. Cold compresses should be advised until the bleeding has been arrested, and then one may change to the warm or hot fomentations, according to the degree of infection present. The patient should drink large quantities

of fluids, and take a cathartic if necessary.

The repair of the wounded tissues following simple extraction and surgical removal is surprisingly different. Until Schram did his work, the investigations on bone repair had been directed toward the long bones of the body, which obviously gave the dental surgeon very little information, as we are interested in the elements of the cancellous bone and the soft tissues which cover the alveolus. Dr. Schram started out to determine the part that the bone cells, the compact bone, the marrow, the cancellous bone and the periosteum play in the repair of this tissue and which one of these, if any, plays no part at all. From this initial problem, he extended his observations to the methods of repair following simple extraction and surgical removal of teeth.

He found that the periosteum has no regenerative properties, which is contrary to former teaching. I remember having been taught that as long as we are able to obtain regeneration of the periosteum, we may expect bone regeneration, but according to this experiment, we must change our views and should not expect so much from bone covering tissues.

Eight days after simple extraction, he found the epithelium covering the surface, but the blood clot remaining in the socket. The organization of the blood clot progressed most rapidly near the surface and at the apex of the socket. Blood vessels and connective tissue strands extended out from the socket wall and into the clot; but, in the center, there were as yet many red blood cells still in the process of degeneration. At fourteen days, he found that the columns of connective tissues which extended out from the wall on the eighth day were now becoming calcified and forming new, spongy bone. The entire alveolar wall was being rebuilt. At twenty-one days, the body of the alveolar wall was practically filled in, but there still remained a portion of the blood clot in the center. At forty-eight days, the body of the alveolus was complete, and enough of the cortical covering showed to assume that it would be completed over the entire area.

Fourteen days after a surgical removal, he found a much more rapid organization of the blood clot and the entire wound was being filled with connective tissue. The cut surface of the bone was being covered with new bone, but there was no evidence of bone formation from the periosteum. In fact, at the crest of the lower buccal margin, there was active bone destruction.

Forty-eight days after the surgical removal the bone destruction had ceased, except at the crest, where it continued, but at this point, a rounding off process seemed to be going on. New bone was being deposited around the old spicules, which means that a cortical layer will eventually be formed.

The end-results, therefore, of these two methods are that, in the forceps or simple extraction of teeth, healing takes place by retaining the blood clot and the entire ridge is rebuilt, but the completed process of healing is slower than in the surgical removal. After the latter procedure, even though the healing process is slightly faster and carried on by the formation of granulation tissue, there is no regeneration of the buccal plate and there is a marked rounding off of the lingual plate of bone.

There are cases wherein the preservation of the ridge is no doubt of prime importance to the successful replacement of an artificial denture or some other prosthetic appliance and I can see where this fact alone could determine the method to be used in the removal of teeth.

CONCLUSION

The laity are not becoming interested in dentistry but have already become so. They are looking to the dentist as an oral diagnostician, and the general practitioner in turn looks to the oral surgeon as the court of appeals in the field of oral pathology. To cope with this situation, we must be honest with our patients and become informed on the reaction of dental conditions upon the body and the relation of general disease to oral conditions. In other words, we are expected to recognize symptoms as they appear in the mouth and evaluate them as indicative of constitutional diseases. Management of oral surgery cases will be simplified and improved when we pay more attention to the general condition of the patient. Frequently, our routine plans will be changed because of better understanding of the part oral lesions play in the constitutional picture. We should no longer expect, nor be expected, to take full responsibility for recovery in a case when complications are out of our control. Responsible laboratories are at our disposal for examination of the blood and, beyond that, the physician should assume his share of responsibility for the patient's recovery. Dentistry, and particularly oral surgery, is fast becoming a connecting link with medicine.

In deciding on the surgical procedure in any given case, we must consider the local condition to be handled, the general condition of the patient, the complications to be met, and last, but by no means least, the most desirable end-results. The easiest way out is not always the best, but the same may be said of the most difficult procedures.

The work of Dr. Schram is a most creditable piece of research, and his findings can be applied to advantage by all of us.

TRAUMATISM OF THE FACE AND JAWS WITH SPECIAL REFERENCE TO COMPLICATIONS*

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LAST year, I was privileged to read a paper[1] on the subject of traumatism of the face and jaws before the American Society of Oral Surgeons and Exodontists. At that time, I outlined some fundamental points for the immediate treatment of fractures of the mandible and maxilla, and emphasized particularly methods of immobilization.

In this paper, I believe that I should place some special emphasis on the treatment of complications that may arise during the course of treatment of these fractures, and also secondary deformities arising from imperfect results, often attributable to conditions beyond our control.

It is unnecessary to emphasize the fact that adequate, intelligent first aid treatment is the greatest safeguard against complications and the subsequent de-

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 11, 1933.

1. Kazanjian, V. H.: Treatment of Automobile Injuries of Face and Jaws, J.A.D.A., 20: 757-773 (May) 1933.

formities that may arise. Unavoidable difficulties and adverse situations must be expected from time to time, situations over which the surgeon may have no control. On the other hand, a complete knowledge of possible complications and their treatment will not only affect our procedure consciously or unconsciously but will also give added confidence to the operator. As you know, injuries of the face generally involve the soft tissues as well as the bony structure. As the oral surgeon is more intimately interested in

Fig. 1.—Left: Picture of patient before accident, showing general contour of face. Right: Picture of patient showing change in appearance a year after accident. There is extreme retraction of the bones of the upper half of the face.

the treatment of the maxillary and mandibular fractures, I shall try to describe the treatment of complications arising from injuries to these parts as well as injuries to the soft tissues.

CARE OF LACERATIONS OF THE FACE

Injuries of the soft tissues of the face may be trivial, consisting of bruises, cuts or both; or they may be of a more serious nature, with deep lacerations. In order to treat these injuries intelligently, and combat possible infections, it is necessary to have in mind the general behavior of wounds and the reaction of tissues in general to invading micro-organisms. Alexis Carrel,[2] years ago, made an extensive bacteriologic study of various types of raw wounds, and he has recorded certain interesting observations which are quite applicable to present civilian injuries. His studies indicate that during the first few hours after infection of the wound, the smears, in general, showed no micro-organisms, while cultures were positive. After five or six hours, micro-organisms began to appear in the smear, and they were more localized in the areas close to the foreign bodies. At the end of twelve

Fig. 2.—Repair of fibrous band encroaching on alveolar process.

hours, organisms appear more constantly and in greater abundance; while after twenty-four hours, the entire surface of the wound was covered with micro-organisms. A close examination of a great number of wounds has shown that micro-organisms remain as a rule on the surface of the wound. They first invade blood clots and the tissues not participating in the circulation.

Face wounds are all potentially infected. The bacterial invasion is rapid even in the absence of foreign bodies.

2. Carrel, Alexis, and Dehelly, G.: Treatment of Infected Wounds, London: University of London Press, Ltd., 1918; p. 73.

They may gain their entrance through the broken skin, or through the nasal and oral cavities, if there is any communication. Such wounds are usually lacerated, uneven and jagged, and it is reasonable to believe that some particles of tissue are bruised and deprived of the normal blood supply, and thus become culture mediums for bacteria. Moreover, the collection of clotted blood and foreign bodies, such as particles of wood, glass and dirt, that are usually found in the depth of such wounds predispose to infection.

Owing to the great number of hospitals, injured patients are usually given immediate first-aid treatment and thus

Fig. 3.—First step in operation for extension of ridge, shown by dotted lines. The incision is made about 1.5 cm. from the border of the adhesion.

possibility of infection is minimized. The important fundamentals of first-aid treatment are: (1) a thorough mechanical cleaning of the wound and careful examination of all the pockets of the wounds for foreign bodies; (2) the removal of all blood clots and the achievement of adequate hemostasis before suturing; and (3) the excision of all loose particles of tissue and uneven surfaces before suturing. Superficial wounds may not require any drainage, as there may be enough space for the accumulated fluids to escape through the suture lines; but all deep wounds should have drainage established at a convenient point. Disregard of this simple rule of established drainage has caused many complicated situations.

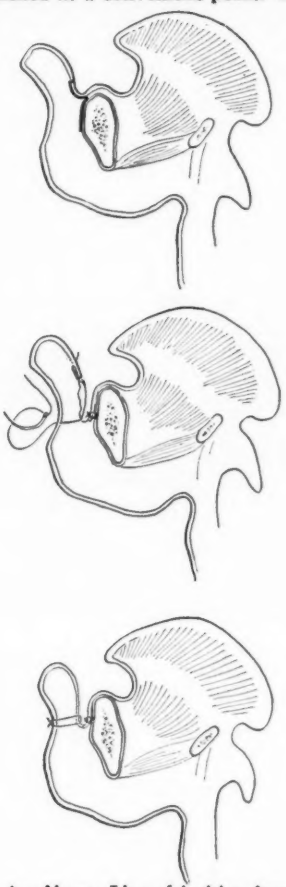

Fig. 4.—Above: Line of incision from over mucous membrane of lip down to periosteum of mandible. Center: Flap (above) placed over periosteum of mandible and sutured. Below: Mucous membrane stretched to base of groove to cover raw surface of inner side of lip, and held in position with through and through sutures.

The following case is illustrative.

The patient had a severe accident, suffering multiple deep lacerations of the face, comminuted fracture of the mandible and fracture of the malar and nasal bones. He was immediately given first-aid hospital treatment and the attending surgeon took great pains to suture all the wounds of the face, allowing no drainage. The patient was seen by me twenty-four hours later. At this time, his face was greatly swollen and indurated, and his temperature was rising. Two days later, abscesses began to develop in various parts of the face, necessitating the establishing of drainage in all the deep wounds which had been sutured. These abscesses persisted for several weeks, greatly interfering with the normal healing of the tissues.

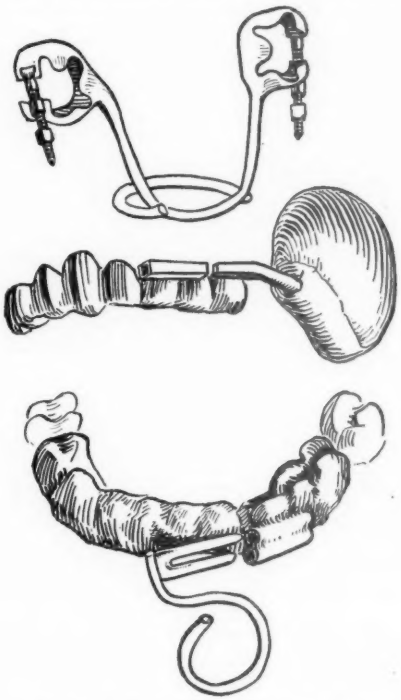

Fig. 5.—Various splints to hold dental composition mold in position for skin grafting within oral cavity.

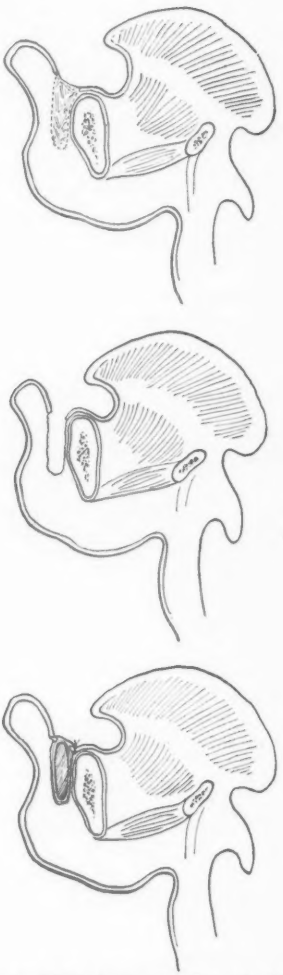

Fig. 6.—Method of extension of ridge by skin grafting in edentulous mouths for cases wherein presence of scar tissue makes it unsuitable for type of operation illustrated in Figures 3 and 4. Above: Excision of scar. Center: Raw surface to be covered with skin grafting. Below: Modeling composition mold covered by skin grafting and held in position by suturing mucous membrane borders together. The mold is usually removed after four or five days.

It is a safe rule to have adequate drainage in all primary suturing of deep wounds, and wounds communicating with the oral cavity and with fractured bones.

If the wounds are already infected and inflamed, as they are likely to be if first-aid treatment is given after twenty-four hours, it is necessary to sterilize the wound with frequent packs and hot applications and perform the late primary suturing within a few days. While all of these precautions are intended to prevent secondary infection of the sutured wounds, they are equally important from the standpoint of minimizing cicatrization, as even mildly infected wounds will result in more conspicuous scars than will noninfected ones.

Fig. 7.—Comminuted fracture of mandible. The alveolar process carrying some of the anterior teeth is fractured and pressed toward the floor of the mouth.

FOREIGN BODIES

As I have said before, in wounds of the face, it is not unusual to find particles of glass, pieces of dirt, small stones, parts of teeth and spiculae of bone, in the case of fractures, and occasionally pieces of vulcanite rubber scattered in the soft tissues of the mouth and face. Occasionally, minute particles of dirt and powder are scattered superficially under the skin. These are easily removed by mechanical cleaning of the wound, but will cause ugly discoloration of the skin simulating tattoo marks if they are allowed to remain.

Foreign bodies may be tolerated by the tissues and remain there indefinitely without causing any disturbance. This is not always the case, and, at times, when they have been tolerated for some time, they cause enough irritation to keep the tissue in a swollen indurated condition affecting the contour of the face. This is especially true when particles of glass are incapsulated in the wound.

Fig. 8.—Destruction of bony tissue following fracture and osteomyelitis of jaw. The missing tissue covers the greater part of the ramus and entire angle of the jaw. There is extreme forward displacement of the remaining part of the ramus.

When teeth or spiculae of bone or other foreign bodies are scattered in the soft tissues of the mouth after a fracture, they invariably cause complications. Surgical cleaning to remove detached parts of bone, broken teeth and alveolar processes as the first step in the early

immobilization of the fracture is the greatest safeguard against spreading infection. To discover their presence, roentgenograms of the fractured area give invaluable aid.

COMPLICATIONS DEVELOPING FROM DELAYED IMMOBILIZATION OF FRACTURES

Fractures should be immobilized as soon as possible in order to make the patient comfortable, to hasten the healing process and above all to prevent the spread of infection into the fractured area. As you know, most fractures, especially of the mandible, are compound and at times comminuted. They have

Fig. 9.—Complete consolidation of bone transplant.

either communication through the oral cavity or through an external wound. The constant mobility of the parts, and seepage of the oral secretions through the fracture line, may lead to the formation of submaxillary or sublingual abscesses, or even localized osteomyelitis.

In a former paper,[1] I have described various first-aid methods of immobilization which may be carried out at the bedside or operating table with the aid of ready-made bands, arch wires, elastics and wire hooks. Later, these emergency means can be replaced with more positive splints.

LATE COMPLICATIONS

So far, my discussion has dealt with the complications that are likely to occur in the early days of the injury. In the course of treatment, there are a number of complicating situations that arise from time to time. These are: (1) late formation of abscesses; (2) late healing of fractures; (3) malunion in fracture, and (4) nonunion in fracture.

Fig. 10.—Patient in Case 5; showing laceration of lip. The greater injury consists of the comminuted fractures of the mandible and maxilla.

LATE ABSCESSES

It is not uncommon in the course of treatment of fracture of the mandible to observe swelling and tenderness in the submaxillary or sublingual regions, eventually terminating in an abscess. In many instances, these abscesses may be attributed to the presence of foreign bodies, to which I have referred above,

but more frequently they are caused by infected teeth in the line of fracture. I should like to emphasize the importance of removing these teeth before they cause trouble. The line of fracture often runs through the tooth socket, depriving one or more teeth of their blood supply. Eventually, the pulp contents become infected and cause the infection to spread. These teeth may look perfectly sound at first examination, but roentgenograms will invariably show the proximity of the fracture to the root end. Conservatism and overeagerness to save a tooth are here

Fig. 11.—Patient (Case 5) shown in Figure 10. Disturbance of the occlusion is mostly due to the backward displacement of the maxillary bone.

a very poor policy. Experience has repeatedly shown that these teeth, if left in place, will eventually cause trouble. An exception may be made to this rule when the posterior fragment of a fracture carries one tooth which is essential for the alinement of the fragments. For instance, in a fracture between the second and third molar, one is justified in retaining the third molar for a few days only, in order that the soft tissues may gain enough stability to hold the fragment in position.

To summarize: One should remember, as a means to prevent the ever-threatening abscess, to look early in the course of treatment for devitalized teeth in the area of the fracture line, foreign bodies or detached necrotic bone.

MALUNION OF FRACTURES OF THE MAXILLA AND MANDIBLE

It is a cardinal rule in the treatment of fractures that the parts should be

Fig. 12.—Method of immobilization of fractures of mandible and maxilla (Case 5).

brought into alinement according to the former occlusion of the teeth of the patient. Failure to follow this precept will result (1) in external deformity of a varying degree and extent and (2) the reduction of the masticatory power of the dental mechanism. The bones of the face form the framework and support of the soft tissues; therefore, even a slight distortion of their position is bound to produce changes in the contour of the face. These changes are often very disfiguring.

In photographs of a young lady before and after an accident, we first see the contour of the face well proportioned and in harmony with the normal occlusion. In a second picture, taken a year after the injury, we see a complete change of the facial contour principally owing to extreme retraction of the maxillary bones, with undue protrusion of the lower jaw.

Often severe fractures of the maxilla result in backward and lateral displacement, and if no adequate means are employed to reduce this displacement during the first few days after the accident, there is likely to be a permanent deformity.

Fig. 13.—Appearance of patient (Case 6) a week after accident. The exposed mandibular bone is seen through the external wound.

As maxillary fractures are more or less impacted and are in contact with various bones of the face, they heal quite readily.

Malunion of mandibular fractures are serious, but they are susceptible to subsequent surgical treatment, as it is possible to refracture in order to obtain the desired result. Unfortunately, as this procedure is not possible with fractures of the maxilla, every effort must be made to avoid deformities in the primary union of the segments.

NONUNION OF FRACTURES

Nonunion of fractures of the mandible result from (1) definite loss of bone tissue, and (2) faulty alinement of the fragments.

Loss of bone may occur in the initial trauma, as is often seen in gun-shot wounds when a segment of bone is destroyed; or it may result from infection followed by osteomyelitis and necrosis. Faulty alinement of the parts is particularly seen in fractures about the angle of the mandible, where it is usually

Fig. 14.—Comminution of right side of mandible with various parts held together by silver wire.

difficult to control the posterior fragment.

In the treatment of nonunited fractures, where a considerable section of the bone is lost, it is essential to keep the parts in normal position until healing of the soft tissues is complete. Our eventual treatment consists of transplanting bone to restore the continuity of the mandible. For this purpose, I can recommend employment of an osteoperiosteal graft. As

an operative technic, it is simple, and its eventual success is reasonably well assured. Objection to the osteoperiosteal graft has been raised on the ground that it is not strong enough nor bulky enough to stand the strain of mastication. It has been my experience that to use layers of graft will assure the additional strength required.

About the face and jaws, there are many deformities of traumatic origin that require further attention and repair, such as conspicuous scars, distortion of various parts of the face, adhesions of the mucous membrane of the mouth and alveolar process and mucous membrane. As a consequence, one finds adhesions over the alveolar ridge where the buccal groove is entirely destroyed and the loose mucous membrane of the cheek adheres to the center of the ridge. This condition causes the patient a distinct handicap, for it limits the movement of the lips and cheek, produces a certain amount of distortion of the lips and, finally, creates difficulties for the prosthetic replacement of the missing teeth. To repair these conditions, it may be necessary (1) to take a mucous membrane flap from the cheek tissues and place it over the affected area; or (2) to resort to skin-grafting within the mouth.

Fig. 15.—Appearance of Case 6 three months later (Figs. 13-14); showing complete consolidation of the mandible.

distortion of the alveolar ridges. As the oral surgeon is primarily interested in deformities of the buccal cavity, I shall discuss the most common secondary defects and outline the operative treatment.

The overriding of fractures occasionally causes distortion of the normal contour of the alveolar processes, especially in edentulous patients. The treatment consists of exposing the bone and removing the prominence with rongeurs. The most common defects about the mouth result from the loss of teeth and

If the deformity consists of nothing more than the extension of a fibrous band over the center of the ridge, such as we occasionally see at the frenum or at the lateral aspect of the jaws, it is easily repaired by a horizontal incision extending from the base of the adhesion toward the buccal fold. (Fig. 2.) This will leave a raw surface when the loose end is pulled out of position, which is repaired by suturing the mucous membrane

borders together. If the last suture is too tense, it may be necessary to make a horizontal incision along the buccal groove in order to approximate the borders. This method leaves a raw surface over the alveolar ridge, but as one side is covered with normal mucous membrane, this raw surface will heal without distortion of the loose buccal tissues.

If the fibrous adhesions cover an extended area over the alveolar ridge, the following operation, which I have used for many years for ridge extension, whether of traumatic origin or otherwise, is well adapted for such conditions. A horizontal incision is made on the surface of the lip or cheek on a line parallel to the alveolar ridge and about 1.5 cm. externally from it. (Fig. 3.) With a sharp instrument, the loose tissues under the mucous membrane are undermined and freed from the membrane, and as far down the external side of the periosteum as is necessary. This loose flap of tissue attached to the alveolar ridge is then pushed or folded down against the periosteum and sutured in place. The raw surface on the lip or cheek is then closed by suturing together the top and bottom margins of the raw area. Sutures may be passed through to the skin, if necessary, since these do not leave any permanent scars. (Fig. 4.) There are one or two points of technic that must be followed for successful results. First, the incision line should be far enough from the ridge to allow enough mucous membrane to cover the newly formed ridge; secondly, the periosteum must not be disturbed, but all the submucous tissues should be pushed apart from it; and care must also be taken in suturing not to tear the periosteum. This operation is equally adaptable for reformation of the buccal groove for either the upper or the lower jaw.

Fig. 16.—Picture showing external wound previously sutured which has developed a keloid scar, subsequently removed.

Fig. 17.—Appearance of patient in Case 7, nineteen days after accident.

In some cases, in which there are indurated scars and deep adhesions, a sufficient amount of mucous membrane is not available for the above-described operation, and we are obliged to resort to skin grafting.

Grafting skin within the mouth is as practical as grafting it on any other part of the body. The requirements of successful grafting in general are as follows: The bed of the graft should have a good blood supply and be free from active infection and cicatricial tissue. All active

bleeding should cease before the transplant is put in position. The transplant must cover all the raw area and must be held in position under moderate pressure. The parts must be immobilized for at least five or six days. The main difficulty of skin grafting within the mouth lies in devising a method to hold the transplant. For this purpose, it is necessary to prepare suitable appliances previous to the operation. If there are sound teeth available, they may be utilized for retaining the appliance by means of either bands or dentures. Modeling compound

Fig. 18.—Extreme comminution of mandible with large section of bone missing.

is added to the appliance to conform to the area to be transplanted. (Fig. 5.) A thin epidermoid graft is removed from the leg or arm and is spread over the modeling compound mold. This is put in position with the raw surfaces of the graft and of the bed approximating each other. In edentulous cases, one is obliged either to make appliances with attachments extending from the mouth to the head, similar to Kingsley's appliance, or to bury the compound mold in the tissues and suture the borders together as first recommended by Esser. (Fig. 6.)

REPORT OF CASES

CASE 1.—D. B., aged 21, was injured in an automobile accident, Nov. 10, 1931. I saw her twelve days after the accident. The lips and upper part of the face were slightly swollen. There was a healed, lacerated wound on the mucous membrane of the lower lip. Two of the lower anterior teeth were missing, but there was no evidence of a transverse fracture of the mandible. The maxilla was badly comminuted with the parts distorted and pushed backward. On the right side, the posterior teeth were in lingual and distal occlusion, while the teeth on the left side had an open bite of about one-half inch. The upper right cuspid, lateral and two central incisors and left lateral incisors were missing. The left half

Fig. 19.—Case 7 (Figs. 17-18). No attempt has been made to repair the external wound. In fact, the left corner of the mouth has been separated to allow more freedom for the treatment of the fractures of the lower jaw.

of the upper jaw was loose and distorted toward the median line. There was also a lacerated wound on the anterior part of the palate extending almost to the middle of the palate. There was anesthesia of the left infra-orbital region, but the outline of the lower border of the orbit seemed to be normal.

November 24, fracture bands were fastened to the upper and lower molars and arch wires placed in such a way as to allow constant springiness in order to push the distal fragments outward. A Barton bandage was applied with elastics fastened laterally on each side, so as to press the lower jaw against the

upper. This constant pressure gradually reduced the displacement until there was very little space between the upper and lower teeth on the left side.

November 28, the patient was operated on under ether anesthesia. The wound of the palate was opened, and some necrotic bone, including the misplaced cuspid tooth, was removed. The antrum was exposed through this same opening, and the internal wall was found to be comminuted. Rubber tubes were inserted through this wall for drainage. The upper right bicuspids were loose and there was a fracture just above the alveolar process, but no attempt was made at this time to remove the fractured process.

Jan. 24, 1932, the wire splints were replaced by a temporary dental plate, which was made to act as a splint for the ununited fragments of the upper jaw.

Fig. 20.—Photograph of patient (Figs. 17-19) taken a few days after repair of face.

When the patient was last seen, April 12, 1932, the fractures had united and the upper and lower jaws were in good alinement.

CASE 2.—L. S., aged 25, was injured in an automobile accident, Jan. 13, 1932. When I saw her, the following day, she was unconscious and bleeding from the left ear and nose, but examination did not reveal any neurologic symptoms.

Examination of the mouth showed the entire lower jaw retracted fully 1 inch, the mouth being left wide open. The lower central incisors were loose, fracture of the alveolar processes as well as a vertical fracture being evident. The extreme retraction of the jaw suggested a double fracture at the region of the rami and possibly the necks of the condyle. A roentgenogram taken the following day was negative to any trauma at the temporomandibular region, but showed a definite fracture of the lower central region with comminution of the anterior teeth.

January 17, the patient was operated on under local anesthesia. The comminuted bone fragments were removed and also the four lower central incisors. The lower jaw was brought forward gradually by the use of elastic bands. As soon as normal occlusion was achieved, the upper and lower teeth were wired together, being held in position until consolidation was complete. The wires were removed, January 19, but there was marked adhesion of the mucous membrane of the lower lip to the alveolar process, causing retraction of the lip and making future dental restoration impossible.

February 9, the patient was again operated on under local anesthesia. All adhesions of the lower lip were freed and the scars of the chin excised. Prior to the operation, a small dental plate was made to retain a dental compound mold. This mold was used after the operation to keep the adhesions from forming again.

Fig. 21.—Latest photograph of patient, after completion of treatment.

When I saw the patient, June 10, 1933, she had gained all the functions of the lower jaw, the occlusion of the teeth was good and the lateral as well as the anteroposterior movements were normal.

CASE 3.—W. L., aged 11, who was seen Jan. 29, 1933, had been injured in a coasting accident, January 23. He was found unconscious, bleeding from the mouth, face and scalp.

Examination revealed a compound comminuted fracture of the lower jaw at the median line. The segment of bone carrying four teeth was pushed toward the base of the tongue, and there was considerable laceration of the tissues of the mouth. One of the upper central incisors was missing and the other was quite loose. There were several cuts on the chin, and there were two partially healed scalp wounds. A roentgenogram taken January 29 showed a comminuted fracture of the lower jaw with the loose fragment completely detached from the main body; but there was definite continuity of bone at the lower border.

The patient was operated on, January 30, under ether anesthesia. A loose segment of bone was removed from the lower jaw, measuring approximately 1 to 1½ inches in diameter and extending almost to the lower border of the mandible. Wires were placed around the necks of the upper and lower teeth on each side, and by means of a series of elastic bands, an attempt was made to bring the teeth back to normal occlusion.

Roentgenograms, taken February 14, revealed a fracture of the mandible just to the left of the symphysis.

February 16, a band splint was constructed for the lower jaw, utilizing the teeth on either side of the fracture. In order to regulate the occlusion, it was necessary to have a wire loop on the right side to prevent the lower jaw from sliding to the left.

The splints were removed, March 16. The jaw was consolidated and the teeth were in normal occlusion.

CASE 4.—M. McM., aged 24, suffered a fracture of the mandible after extraction of the lower left third molar tooth in July, 1931. Infection developed, followed by osteomyelitis, which eventually destroyed the greater part of the ramus and a portion of the body of the mandible. The missing portion of the bone extended from the first molar region almost to the neck of the condyle. The posterior fragment was shifted forward and lay almost in a horizontal position. The patient was wearing a denture which held the remaining part of the mandible in proper occlusion. (Fig. 8.)

July 15, 1932, I operated on the patient under ether anesthesia. An incision was made about 5 cm. in length, a little below the lobe of the ear. The proximal and distal parts of the mandibular segments were located and the bony stumps denuded with a periosteal elevator. Three layers of thick osteoperiosteal graft, taken from the tibia, were inserted and held in position by catgut sutures. The upper and lower jaws were wired together with the dental plate in position. The patient made an uneventful recovery, and, December 1, roentgenograms revealed complete consolidation of the transplant. (Fig. 9.)

CASE 5.—Mrs. M. M., aged 32, was injured in an automobile accident, May 7, 1933. She was unconscious for a few hours. The pulse was slow and the blood pressure 90 systolic and 50 diastolic. She was given shock treatment and the pulse and blood pressure gradually improved. She also had severe hemorrhage from the mouth and nose, which was finally controlled by packing the nasal cavity.

I saw the patient on the following day. Her face was greatly swollen and there was considerable ecchymosis of the conjunctiva, eyelids and zygomatic region. A few lacerated wounds about the lip had been sutured the night before by the attending surgeon. Examination of the mouth revealed a comminuted fracture of the lower jaw involving the entire right side. Particles of the alveolar process and loose teeth were pushed toward the floor of the mouth. There was also a vertical as well as a horizontal fracture of the maxilla, with the alveolar process on the right side pushed toward the median line. The occlusion of the teeth was badly disturbed. (Figs. 10-11.)

The general care of this case up to the time of operation consisted of warm applications about the face, warm irrigations of the mouth, liquid diet and sedatives. Special care was taken to remove the nasal packing gradually in order not to precipitate another hemorrhage.

Operation was performed under avertin anesthesia, May 15. All the loose teeth and broken down alveolar process of the lower jaw were removed. Ready made "usona" bands were fastened over the upper and lower molars and an arch wire was used to immobilize both the upper and the lower fractures. In addition, intermaxillary elastics were applied to bring the remaining teeth into normal occlusion. An elastic bandage was applied externally in order to force the upper and lower jaws together. (Fig. 12.)

The patient's condition improved after the operation and the mouth wound healed rapidly. One week after the operation, a swelling developed under the chin. New roentgenograms showed that the right lower first molar had been involved in the comminuted area, a condition not shown in the previous films.

May 27, under local anesthesia, the wire

splints were removed from the lower jaw and the right lower first molar tooth was removed. A sublingual abscess was opened and external drainage established. The patient was discharged from the hospital, June 4.

At the time of her discharge from the hospital, the upper and lower teeth were in good occlusion, but the external fistula was still suppurating.

June 22, both the upper and the lower splints were removed. The fistula closed after several spicules of necrotic bone had been removed.

The patient was seen, July 13, and it was decided to operate again in order to excise the scars of the lower lip, which were quite conspicuous and causing distortion of the lip. It was also decided to excise the adhesions of the alveolar process of the anterior region of the lower lip which were causing retraction and a certain amount of immobility.

An operation was performed under local anesthesia, July 19, 1933. The scar on the lower lip was excised, the edges being undermined and brought together with fine silk sutures. Both mental nerves were injected with 2 per cent procaine and the oral surface of the lower lip was infiltrated. A curved incision was made through the mucous membrane down to the periosteum about one fourth inch anteriorly from the alveolar margin. The periosteum of the lower jaw was exposed and the mucous membrane attached to the margin was sutured downward to the periosteum. The mucous membrane of the lip at the edge of the incision was then sutured downward into the groove by mattress sutures brought outward through the skin near the lower margin of the mandible. These sutures were tied over gauze. This operation deepened the buccal groove in the anterior surface of the mandible. There was considerable improvement in the contour of the lower lip after the operation.

Case 6.—N. R., a man, was accidentally shot, Oct. 6, 1930. His injuries consisted of a comminuted fracture of the right mandible and lacerations of the face. He was taken to a local hospital where he was given immediate attention.

October 13, he was admitted to the Massachusetts General Hospital. Examination revealed a large external wound following the lower border of the mandible, through which particles of necrotic bone could be seen. (Fig. 13.) Roentgenograms revealed comminution of the right side of the mandible, the various parts being held together by silver wires. (Fig. 14.)

November 6, the patient was operated on under ether anesthesia. All the loose particles that could be felt were removed extra-orally. All the loose teeth were then removed and the jaws approximated and drawn toward the left into normal occlusion with the aid of elastic bands attached to wire buttons. External drainage was established. No attempt was made in this operation to remove any particles of bone that were likely to have enough vitality to regenerate, but strict measures were taken to keep the remaining upper and lower teeth in normal occlusion. The external wound was also left open, as it acted as an efficient avenue for drainage. The patient was discharged, November 19, to the Harvard Dental School for follow-up treatment.

Feb. 10, 1932 he was again admitted to the hospital for repair of the face. Examination of the jaws at this time revealed complete regeneration of the mandible. (Fig. 15.) The operation for repair of the face was performed, February 11. The scar, which extended from the right corner of the lip to the back of the lobe of the ear, was excised. The edges of the wound were freed and the borders sutured together. The patient was again operated on for the removal of a keloid scar, which had developed in spite of roentgen-ray treatment. (Fig. 16.)

Case 7.—K., a man, was admitted to the Massachusetts General Hospital for treatment of a gunshot wound of the face, Nov. 17, 1930. He had been injured nineteen days previous to admission and had received treatment at a local hospital.

Examination revealed a large irregular wound with jagged borders on the left cheek. (Fig. 17.) The wound communicated with the oral cavity and the maxillary antrum. There was a comminuted fracture of the left jaw anteriorly from the last remaining molar tooth. There was a section of bony tissue, almost 2 inches long, missing from the body of the mandible. There were several loose fragments of bone in the soft tissues and also a considerable number of foreign bodies, resembling bird shot, scattered over the left side of the face. (Fig. 18.)

The treatment of this case took a long time and involved several operations. The main points of the treatment will be mentioned. No attempt was made to repair the external wound. In fact, the left corner of the mouth was separated in order to allow more freedom for the treatment of the fracture of the lower jaw. (Fig. 19.) The principal point of immobilization of the fracture was to hold the

remaining fragments in their respective positions. A wire splint was used at first, the end of which was fastened to bands fitted over the remaining teeth on the left side, while the other end was fastened to the bone by a fork-like projection. This held the fragments in position until all the necrotic bone was expelled. A vulcanite dental splint made and adjusted by Dr. Strock was then used to keep the parts in position. Needless to say, there was a wide gap between the fragments.

The operative treatment for repair of the facial wound consisted of (1) removal of loose fragments of bone (Nov. 29, 1930) with any foreign bodies that could be found in the soft tissues; (2) closing the face wound (April 24, 1931) by utilizing the mucous membrane of the left cheek to form the inner surface and by transposing a flap from the neck to cover the external surface. (Fig. 20.) Oct. 10, 1931, the patient was again operated on and thick layers of osteoperiosteal graft from the tibia were used to fill the gap between the fragments of the mandible.

The last plastic operation was performed, Feb. 8, 1932, for the repair of the corner of the mouth. The continuity of the mandible was established by bone transplantation. The patient had lost all the teeth with the exception of the lower incisors. (Fig. 21.)

THE DEVELOPMENT OF ORTHODONTIC EDUCATION*

By SAMUEL J. LEWIS, D.D.S., Detroit, Mich.

WHILE dental literature began with the writings of R. C. Skinner in 1801, it remained for Fitch to correlate the entire field of dental science and art in his work "The System of Dental Surgery," published in 1829. This was the first comprehensive dental treatise in the English language. The decade between 1829 and 1839 marks the beginning of American dentistry. During this decade, in 1834, to be exact, the first society of surgeon dentists was organized in New York City. Formal dental education began in America in 1839—an important year in American dental history. The Baltimore College of Dental Surgery was established, the first periodical devoted to dentistry was published and the American Society of Dental Surgeons was organized.

Orthodontic education itself began with the lectures of Chapin A. Harris on irregularities of the teeth at the first American dental college. Chapin, a follower of Fox, lectured to his students on the use of wedges in moving teeth. It was not until after 1857 that orthodontia was taught as a special subject at the college. Henry Bliss Noble, a graduate of the class of 1857, while a general practitioner of dentistry, in a measure made a specialty of correcting irregularities of the teeth, and became a special lecturer on the subject in the Baltimore College of Dental Surgery and also in the Dental Department of Columbia University.[1]

The growth of the conception of ortho-

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 11, 1933.

1. Personal communication, dated March 1, 1933, from G. M. Anderson, who cites: Harris, C. A.: Principles and Practice of Dental Surgery, Ed. 2, 1845. Simon, William: History of Baltimore College of Dental Surgery, Tr. 4th Internat. D. Cong., 1904, pp. 290-293. Am. J. D. Sc. (edited by Chapin A. Harris), new series, Vol. 1, 1850, pp. 36-37.

dontic treatment must of course be considered along with the history of education in this field. Though we do not know how early dental irregularities were treated, it was Fauchard who devised the first modern appliance, the expansion arch, which, though modified and improved by later workers, forms the basis of present methods of treating irregularities of the teeth. In 1728, Fauchard published what Johnson calls "the earliest attempt in the literature at systematic treatment of orthodontia."[2]

As early as 1829, Bell, in his book on "Anatomy, Physiology, and Diseases of the Teeth," classified dental irregularities according to disturbances in the shedding of the deciduous teeth. Irregularities associated with the crowding of permanent teeth he called "permanent"; those associated with the deciduous teeth he called "temporary." He attributed dental irregularities to a lack of sufficient room in the jaw to permit of the regular arrangement of the teeth, and, in treatment, often advised extraction of one or more permanent teeth to make room for the crowded ones. However, he congratulates himself on the results in a number of cases in which he refrained from extracting teeth and the arch naturally expanded sufficiently to admit the irregular tooth, and he advises that time be allowed for the natural expansion of the maxillary arch before resorting to extraction. I mention these facts because the teaching of modern orthodontia has been torn between two schools, one favoring extraction, the other opposed to it.

The word "orthodontia," or its equivalent, first appeared in the literature in 1841, when Lefoulon used the word "orthodontosie" to describe the branch of dental science dealing with "congenital and accidental deformities of the mouth."

As the years went by, such schools as the Ohio College of Dental Surgery, the Pennsylvania College of Dental Surgery and the Dental School of Harvard University were established. The formal education of dentists was being improved and enlarged upon, but there is little information about the teaching of orthodontia. Probably lectures on the subject were given as a part of the general course, but it is likely that most instruction in orthodontia was of the preceptor type. Appliances were improved, especially the method of anchoring the expansion arch to the molar teeth.

The orthodontia that was to become a specialty did not emerge until Norman Kingsley, known as the father of orthodontia, began, in 1858, to publish occasional papers on regulating the teeth. As early as 1872, he lectured to students on the causes and correction of malocclusion, stressing the functional as well as the esthetic value of orthodontic treatment. That his thoughts on the subject were modern in implication is borne out by his writings, which consider such biologic aspects of malocclusion as the growth and development of the jaws, the possible effect of certain diseases on the occlusion of the teeth and the application of physiologic force in moving malplaced teeth. It was he who first brought to our attention the method of jumping the bite when the position of the mandible is too far posteriorly. He was also among the first to utilize occipital anchorage in retracting maxillary teeth.

Since the time of Kingsley, there have been many men in the field of orthodontia, but most of them have been more interested in the treatment of malocclusion than in formal education. Such men were Fuller, Stellwagen, Forbes and Knapp. Some of them, in all probability, taught in the dental colleges, but there

2. Johnson, A. L.: Orthodontia, Encyclopedia Britannica, Ed. 14, Vol. 16, p. 938.

are few records to enlighten us as to just how or what they taught.

The first textbook on orthodontia appeared in 1889, when Simeon H. Guilford, at the request of the National Association of Dental Faculties, wrote a book for the student, not for the practitioner. Guilford was at the time teaching orthodontia to students of the Philadelphia Dental College. As far as we know, this was the first real attempt at an undergraduate course in orthodontia in the United States. The course was entirely didactic and included no clinical work.

With an authentic textbook available, other schools began giving lectures on orthodontia, engaging for the purpose general practitioners who were particularly interested in orthodontia. Usually, these lectures were given in the last half of the senior year. The students, as Dr. Johnson puts it, looked on them as a necessary evil. Though many improvements had been made in appliances and methods of treatment and further ones were in progress, the causes of and factors in malocclusion were a matter of authoritative tradition rather than observation and record. Students were shown pictures of the many crude appliances then in use and were told something about the etiology of malocclusion, as it was then understood, but, as far as I have been able to learn, few if any cases of malocclusion were treated in the clinics. Such treatment as was undertaken involved only the moving of one or two teeth that happened to be out of alinement. Occlusion as we understand it today was not recognized. These early teachers spoke of articulation, but that is about as far as they went.

In the light of newer knowledge, it is clear that the practice and teaching of orthodontia in Guilford's time was concerned with dental irregularities rather than the correction of malocclusion. It could not be otherwise, as is clear from Guilford's statement on the arrangement of the teeth:

> The teeth of man when in normal position are arrayed in symmetrical order, side by side, their outline as a whole describing a parabola or semi-ellipse, their variation from these geometrical figures consisting principally in a slight flattening in the region of the incisor teeth, and a tendency to angularity in the region of the cuspids, owing to the marked prominence of these teeth.

Guilford also made some attempt to classify malocclusion, but did not get far beyond Bell's classification. He did point out two types: that in which the malocclusion is developing and that in which the condition is fully developed. Guilford's influence on orthodontic education was far-reaching, for his textbook was the standard in most dental colleges even as late as 1907, and was translated into several foreign languages.

As the dental colleges continued their interest in orthodontia, more men became interested in the field and more papers on the regulation of the teeth appeared in the literature. About 1881, Eugene S. Talbot began writing papers on the regulation of teeth by direct pressure. In 1888, he published a book entitled "Irregularities of the Teeth," which went through several editions and became a standard textbook. Unlike most other writers in the field, Talbot dwelt on the causes of malocclusion and went so far as to say that, without a knowledge of etiology, no one can successfully correct deformities of the jaws. Though the book contained a description of Talbot's own appliances, he said that if the practitioner were familiar with etiology, his knowledge of principles and mechanics should suggest to him the appliances most suitable for any given case. Talbot made some original investigations, and, though

he may not have contributed much to the mechanical side of orthodontia, his teachings concerning the local and constitutional causes of malocclusion were embodied in courses of lectures given to senior students in the dental colleges and were far-reaching in effect.

During Talbot's time, there was a good deal of controversy about the necessity of extracting teeth to regulate them. Most dentists adopted the practice of extraction, but Isaac B. Davenport championed the other side of the controversy. He wrote many papers on reestablishing normal occlusion, and reiterated his contention that if permanent results were to be achieved, teeth should not be extracted. Davenport's writings on the desirability of maintaining a full complement of teeth later influenced the men who have made modern orthodontia possible.

Among the disciples of Davenport, and first to incorporate his views in teaching and writing, was Edward Hartley Angle, a young and enterprising dentist who was later to exercise a great influence on orthodontic education in the United States.

We first hear of Dr. Angle in 1886, when he read a paper on "Irregularities of the Teeth" before the Minneapolis Dental Society. The next year, he read a paper describing "The Angle System of Regulating Teeth" before the Ninth International Medical Congress. In the same year was published the first edition of his book, "Malocclusion of the Teeth," which has gone through seven editions, the last one published in English appearing in 1907.

As early as 1880, according to Angle's own statements, he became interested in orthodontia and believed that it would sometime be practiced as a specialty. He felt that its importance warranted closer study and application. In 1886, he advocated the teaching and practice of orthodontia as a specialty in a paper read before the Western Pennsylvania Dental Association. He had made several attempts to teach orthodontia as part of the undergraduate curriculum in dentistry and was convinced that it was impossible to do so successfully. Later, he tried to interest the dental departments of the University of Pennsylvania and Northwestern University in forming a special department devoted exclusively to the study and practice of orthodontia. He recommended that orthodontia be taught as an optional course after the second year in the dental school; but to all his pleas and arguments, he was given the same answer: "This is too utopian" or "It is too early."

But Dr. Angle was not the man to give up so easily. Discouraged as he was, he went to the National Dental Association meeting at Niagara Falls in 1899, and there sowed the seeds of the Angle School of Orthodontia. At that meeting, he succeeded in getting four young men to spend three weeks with him in his office in St. Louis. There, he was able to divorce himself from the handicaps of the dental colleges and to surround himself with young men who were willing to study orthodontia in the broad and thorough manner that he had outlined for them. This was the humble beginning of the Angle School of Orthodontia. It was the first postgraduate school to be established. From that time, Dr. Angle conducted a school every year until 1911. As a result, there were, in 1911, approximately 150 men devoting their entire time to the practice of orthodontia.

Among the important factors in advancing Dr. Angle's system, as he then called it, was his classification of malocclusion and his definite plan of correcting malocclusion conditions. Weinberger has aptly said, "This classification, with

his determined stand against extraction of teeth, will be a lasting memorial to him."

Dr. Angle also gave to the dental profession the first scientific treatise on occlusion of the teeth and the first definition of normal occlusion. He made the dental profession cognizant of occlusal condition, and this alone marked a new era in American dentistry.

Each year, Dr. Angle added to his course such subjects as he thought important to the students of orthodontia. He was aided by his close friend, Edmund Wuerpel, an artist and teacher of renown. Former students who showed special abilities were added to his staff. Within a few years, he was receiving more applicants for his course than he was able to take care of. So great was the interest in orthodontia that, in 1911, he had received more than 300 applications for his course; and he could accept only twenty-three.

Though Dr. Angle was a master mechanic, he was ever alert to the other needs of his students, and he brought in such men as were able to tell them something about the collateral sciences. Provost Smith, in conferring on him an honorary degree at the Thomas Evans Dental Institute in 1915, said: "Lover of art and nature, intimate friend of trees and flowers, but preeminently founder of the science of orthodontia, to which the best thought of a life has been given in experiments and in test."

Ill health caused him to discontinue his courses after 1911, but, on regaining his health, he again took up the task of teaching, more particularly because he was dissatisfied with the attempts that were being made to teach this subject, so near and dear to his heart. After taking up his residence in Pasadena, he started the Angle College of Orthodontia, which he conducted on so high a plane that only a few students were able to pass the entrance examination. Those who did pass it were required to spend from one to two years in study. Dr. Angle's untimely death, in 1931, cut short the great work he was doing, but the heritage he left will always act as an impetus to those of his students who were imbued with his spirit. His great work will go on.

After the success of the Angle School, several other postgraduate schools of orthodontia were established. In 1907, Dr. Brady started the International School of Orthodontia, in Kansas City, Mo. In 1912, Martin Dewey, an early student of Dr. Angle's, started the Dewey School of Orthodontia, in St. Louis. Both of these schools more or less followed the pattern of the Angle School. Courses varying from three weeks to six weeks in length were given. Later, these were extended to twelve weeks. The instruction was mainly technical, though some lectures were given on etiology, diagnosis and collateral knowledge. As a general rule, students were carefully selected, and the faculties were made up of outstanding men in the field of orthodontia. On the whole, these short courses were inadequate; for they offered the student no clinical practice, and he was sent out into the world with no practical knowledge other than how to make various types of appliances and the theory of their application. Nevertheless, much credit must go to these early schools; for many of their students have made notable contributions both to orthodontia and to education in this field.

Beginning about 1907, the influence of the many men who had attended the postgraduate schools began to be felt in the fifty or more dental schools in the country. One by one, they added men trained in orthodontia to their faculties, and full courses in orthodontia were offered the undergraduate. Lectures were

given during the senior year, but little of a technical nature was taught. In some schools, simple cases were treated in the clinic. For the most part, the courses were inadequate, and the students still looked on them as a necessary evil. Progress was made, but it was slow.

In the meantime, some of the postgraduate schools had added further subjects to their courses, lengthened the period of study and formed some semblance of a clinic. The students did not stay long enough to see any one case completed, or even the retainers placed. They were still entering the field of orthodontia inadequately prepared to give the service demanded.

It is true that the influence of the American Society of Orthodontia made for better orthodontic practice through annual meetings and clinics, but education lagged behind. Fortunately a few men were thinking seriously of the scientific side of orthodontia. Dissatisfied with progress in the mechanical side alone, they were delving into the biologic aspects of orthodontia. They began to question assumptions in this field and to look for facts upon which to base sound theories. In 1921, Milo Hellman questioned the existence of ideal occlusion and proved that the ideal did not exist. He demonstrated for the first time the functional nature of occlusion and gave orthodontia a yardstick with which to measure malocclusion. A. LeRoy Johnson was studying malocclusion in the light of correlative variation.

The effect of this new thought was that teachers of orthodontia began to see that orthodontia could not be studied from a purely mechanical point of view, but that its biologic aspects must also be considered. It became common knowledge among many practicing orthodontists that orthodontic education in both the dental colleges and the postgraduate schools was inadequate to prepare the orthodontist to meet the demands for service. Entrance requirements had been raised in the dental colleges to include one or two years of preparatory college work, and the students therefore came to the dental college with a little more knowledge of basic science than earlier students had had.

In 1915, Lawrence Baker gave a postgraduate course at Harvard, but little is known about just what type of course he gave. Some schools were giving a great deal of thought to instruction in orthodontia, but, in general, progress was slow.

In 1923 A. LeRoy Johnson read a series of lectures on "Basic Principles of Orthodontia" before a conference of teachers of orthodontia at the School of Dentistry of the University of Pennsylvania. They were published in the same year in the *Dental Cosmos*. These papers marked a new era in orthodontia and orthodontic education. Dr. Johnson disposed of undergraduate instruction in this field by saying that the curriculum should be mainly concerned with the fundamentals pertaining to occlusion, diagnosis, etiology and classification, but that the teaching of appliance construction for the treatment of cases should be discontinued. In other words, the undergraduate student should be taught the fundamental principles of orthodontia, but only the graduate student should be given instruction in treatment. Dr. Johnson outlined in detail a course in orthodontia.

"Basic Principles" was without question the best exposition of the fundamental principles of biologic orthodontia ever presented. As Dr. Hellman wrote in his introduction to the monograph, its scope was so great and its implications so far-reaching that its importance could not be estimated at the moment. It was difficult to appreciate at once all that the

monograph contained, and it was several years before its worth and implications were generally known.

As a result of this epochal work, Johnson was asked to accept the professorship of orthodontia at the School of Dentistry of the University of Michigan, in 1923, where postgraduate and graduate instruction in orthodontia was to be given. The course he outlined was designed for two classes of students, those who had the requirements for a degree from the graduate school and those who did not have these requirements but were to be allowed to take the same course without being candidates for a degree. The course covered one academic year. This, I believe, was the first graduate school in orthodontia. After the inauguration of Johnson's course, other schools offered both types of courses.

Since the publication of Johnson's "Basic Principles" and his first graduate course at the University of Michigan, orthodontic education has continued to be diverse, reflecting the differences of opinion about the nature of orthodontia itself. The biologic theory has continued to gain over the exclusively mechanical conception, which has given rise to almost as many varieties of orthodontic education as there were kinds of appliances. The result is that an increasing number of educators regard this field as a specialty, in which what corresponds to an "orientation course" in other academic fields and preparation in fundamental sciences may be given during the undergraduate years, but preparation for actual practice should be restricted to graduate work.

A few facts and statements about courses in orthodontia, gleaned from papers, catalogs of the schools and letters from orthodontic educators, will show both the highly controversial nature of the subject and some agreement as to what constitutes orthodontia and desirable training for practice in this field.

Of the schools giving postgraduate courses exclusively, the Dewey School of Orthodontia gives a course lasting ten weeks, with the privilege of remaining in the clinic as long as the student desires. Students are advised to spend at least a year in the study of clinical orthodontia and research.[3] At its first session, in 1907, the International School of Orthodontia in St. Louis gave a course covering four weeks of intensive work. At present, the intensive course covers practically three months, and the student has the privilege of remaining indefinitely in the clinic as an intern. This plan is intended especially for recent graduates of dental colleges. Older men are required to return within a year with clinical evidence, case reports and a thesis, before a certificate is granted.[4]

At the Evans Institute in Philadelphia, all instruction in orthodontia is undergraduate work. In the junior year, thirty-two hours of instruction in technical work is given. In the senior year, lectures are given throughout the year and students observe cases under treatment in the clinic.[5]

At the dental schools of the universities, there is a tendency to limit undergraduate instruction to fundamental principles in orthodontia and to abandon the clinical phases of the subject. There is also a tendency to drop postgraduate instruction in favor of graduate instruction.

At the Washington University School of Dentistry, undergraduate instruction consists of lectures in the fundamentals of orthodontia in the first part of both the junior and senior years, a laboratory tech-

3. Bull. Dewey School of Orthodontia.

4. Personal communication from Hugh G. Tanzey, dated Feb. 14, 1933.

5. Personal communication from Frederick R. Stather, dated March 2, 1933.

nic course in the second semester of the junior year and demonstrations in the orthodontic clinic throughout the senior year. All orthodontic demonstration is the work of interns, and no cases of malocclusion are treated by undergraduate students.[6]

At the Dental School of Northwestern University, there is undergraduate work and a graduate course leading to the degree of M.S. in dentistry, but no short postgraduate courses are given. Undergraduate instruction in orthodontia begins in the sophomore year and continues through the senior year. Both juniors and seniors work in the orthodontic clinic. The graduate student may work full time for one year or half time for two years.[7]

The Dental School of Harvard University also gives undergraduate and graduate instruction in orthodontia, but no postgraduate courses. Undergraduate work begins in the second semester of the junior year and extends throughout the senior year. Lectures are supplemented by laboratory training and work in the infirmary, where the students observe clinical demonstrators working on special active cases. The course now includes lectures on growth and development and a special course in metallurgy. The graduate course requires a minimum of a full academic year, and students may return for a second or third year for a minimum of two mornings each week, to carry on cases and research.[8]

At the University of Michigan, instruction is chiefly undergraduate and graduate. There are a few postgraduate students. Marcus L. Ward, dean of the school of dentistry writes:

> I may say that we have abandoned what were formerly the clinical phases of the subject in the undergraduate curriculum, that is, students are not compelled to treat cases in orthodontia for credit toward graduation. They have the opportunity, however, to observe the cases in the graduate and postgraduate departments in much the same manner as students in medicine now have the opportunity to observe certain courses that are known as electives. Clinical phases to which I have referred were dropped from our curriculum ten years ago at the time that we organized our first graduate course in orthodontia. Undergraduates get a course of instruction in the form of didactic work, which is related to the student's earlier biology and to the remainder of the practice of dentistry.

The graduate course requires a minimum of one calendar year. The school usually has a few postgraduate students, practitioners who come two or three days a week and are not candidates for credit. There are also a few special graduate students who are not candidates for a degree.[9]

The plan at the University of California is different from any of these. Under a special curriculum comparable to the plan suggested by Dr. Angle in 1896, undergraduate students may take a major in orthodontics which gives them more training than the postgraduate student gains in a year of special work. Graduate students are required to take twenty units of work, carry on some research and write a thesis. There are also special graduate students whose work does not lead to a degree and who may be compared to postgraduate students in other institutions. The course given them, according to Dr. Lischer, might properly be

6. Personal communication from H. C. Pollock, dated Jan. 17, 1933.

7. Announcements of Dental School of Northwestern University, and personal communication from Abram Hoffman, dated Feb. 15, 1933.

8. Announcements of Dental School of Harvard University, and personal communication from Fred R. Blumenthal, dated Feb. 10, 1933.

9. Personal communication from Marcus L. Ward, dated Feb. 9, 1933.

termed a practitioner training course. Graduate instruction in orthodontics began in 1910 and postgraduate instruction in 1914. Orthodontics as an undergraduate major was begun in August, 1930, at which time the term "postgraduate" was dropped.[10]

At the University of Illinois, the work in orthodontia is chiefly graduate and undergraduate, with some opportunity for postgraduate work. The plan at Illinois, I think, embodies the best current thought on orthodontic instruction. Undergraduate instruction, according to Burne O. Sippy, who is in charge of the work, is not intended to train orthodontists, "but to train students of dentistry to recognize the fundamental principles of orthodontia so that they may give honest and scientific advice to parents and to patients and to recognize when orthodontia management is indicated." Undergraduate students do not treat patients, but follow the progress of the work as carried on by the staff and are quizzed on each case under management throughout the year. A special feature of the training is a "clinical spot" at the end of the senior year, when each student is allowed thirty minutes in which to write a diagnosis, outline a treatment plan and retention plan, and render a prognosis of a case, after he has been allowed thirty minutes to study the case history, roentgenograms, photographs and models.[11] Dr. Sippy was the first to organize a separate clinic and equipment for orthodontic instruction and work.

Of the graduate work at Illinois, Allan G. Brodie, who is in charge of the work, writes:

> The requirements for entrance to the course are the dental degree plus units sufficient to be equal to the bachelor's degree. This provision puts the work in the class of graduate instruction and makes it possible for us to confer the straight master of science degree on those men who offer such credentials and finish the course satisfactorily. Realizing that this works a hardship on the older men whose dental work was taken before the days of the predental course, we have made provision that if there are any vacancies they may be filled by such men and these men will receive the same instruction and be held responsible for the same amount of work, but they receive no recognition so far as degrees, certificates, etc., are concerned. . . . The course runs one calendar year beginning February 1. . . . The time is divided about as follows: half for the major subject, orthodontia, and quarter time each for anatomy and histology.[12]

The work in orthodontia at New York University is perhaps characteristic of the transitional state of orthodontic education at present. Here, the budget for orthodontia, as Frederick Lester Stanton writes, is probably one of the largest in the world, yet there is no attempt to give a graduate course in orthodontia, though there is a clinical orthodontic course given which requires three mornings a week for a period of two years, with the privilege of staying two extra years, a privilege which most students take advantage of. Dr. Stanton's comment is that the experience they are gaining will prove of value when they come to formulate an adequate course later. Orthodontia, as such, is not taught to undergraduates. They are given instruction which serves as a preparation for graduate study in this field.[13]

I should like to compare these descrip-

10. Personal communication from B. E. Lischer, dated Feb. 17, 1933.

11. From a paper on undergraduate instruction in orthodontia, by Burne O. Sippy, and personal communication from Dr. Sippy, dated Feb. 14, 1933.

12. Personal communication dated Feb. 10, 1933.

13. Personal communication dated March 8, 1933.

tions of orthodontic education as conducted at present with excerpts from the letters and articles of orthodontists and orthodontic educators expressing their views on what it should be and will be in the future.

Milo Hellman, in discussing the series of lectures given by Dr. Johnson in 1923, summed up four points which serve to guide orthodontic educators toward a better basis of procedure. These were:

1. That teaching the undergraduate to construct orthodontic appliances for the treatment of cases of malocclusion must be discontinued.
2. That the curriculum for the undergraduate students should be mainly concerned with the fundamentals pertaining to occlusion, diagnosis, etiology—as much as is known about it—and classification.
3. That the orthodontic clinic should be a closed chapter to the undergraduate student.
4. That prognosis and technique of making and using orthodontic appliances for the treatment of malocclusion of the teeth should be limited to postgraduate instruction alone.

This outline of matters to be taken into account in orthodontic education was formulated ten years ago, on the basis of Dr. Johnson's "Basic Principles." The description of courses here presented shows to what extent these goals have been realized. Excerpts from letters and articles on the subject written in the last few years follow.

In 1929, A. LeRoy Johnson, again pioneering in the basic theory and philosophy of his field, contributed to the *Journal of the American Medical Association* a paper entitled "Stomatology: A Problem in Education."[14] In this paper, he asks for a reconsideration of the traditional definitions of medicine and dentistry to permit a proper study and understanding of the oral tissues and processes as integral parts of the human organism. His point is that, owing to the present illogical division of effort between the dental and the medical curriculums, oral disease and deformities and the relation they bear to general body conditions have been neglected; that, to remedy the situation, there should be created a department in medical science that will serve as a liaison between the dental technician and the physician. Such a plan is now in effect at the Yale University School of Medicine, and a similar plan was being inaugurated, at the time Johnson wrote, at the University of Rochester School of Medicine and Dentistry. This new group of workers, Dr. Johnson writes, should in time be a source of teachers and investigators for dental and medical schools. He speaks of the medical school's "traditional aversion for the oral cavity," and, as a result of its independence, the preoccupation of the dental school with technical procedures, to the neglect of the science of oral phenomena and the basic medical concept of the interdependence of all parts and processes of the living organism.

It is on precisely this basis, the concept of the interdependence of the growth and development of all parts and processes of the living organism, that orthodontia has made its rapid advances in the last few years. It has much to gain from a closer alliance with medicine. Frederick B. Noyes, dean and professor of orthodontia at the University of Illinois, goes so far as to say that orthodontia and dentistry are based upon different fundamental sciences and philosophies and that orthodontia is more closely related to orthopedic surgery than to any other field of dentistry. It is his opinion that the undergraduate dental student should be given enough instruction in orthodontia to give him a point of view concerning it and a

14. Johnson, A. L.: J.A.M.A., 92:1500-1503 (May 4) 1929.

realization that it requires thought and technical ability; also, that he should study the principles with reference to the development of the human denture so that he will not create malocclusion. No undergraduate student, Dr. Noyes thinks, should be given a case of malocclusion to treat. Concerning the undergraduate clinic, he writes:

I saw three days ago a patient under treatment for more than three years in an undergraduate clinic in dentistry, for whom nothing had been accomplished. . . . The case had an appliance in place which by no stretch of imagination could ever be expected to produce the reactions which would bring the teeth into the positions in which they belong.

At one time I was asked to take over a dental clinic for the purpose of organizing graduate teaching in orthodontia. . . . When we found that there were more than 300 unfinished cases that had been under treatment two to seven years, we declined.[15]

In a paper "On the Training and Education of a Dentist," Benno E. Lischer, of the University of California, writes[16]:

Notwithstanding these extensions of the dental course, orthodontic instruction for undergraduates has not been essentially altered or enlarged. Some schools have, to be sure, endeavored to solve the orthodontic educational problem by offering graduate work in the subject, and in a few instances, the graduate divisions of university faculties have cooperated to the extent that orthodontic postgraduate students may qualify for the degree of master of science. But while the number of applicants for additional training has increased during the last score of years, relatively few attain graduate standing. Some candidates are ineligible to graduate status because their previous training is inadequate; others are unwilling to devote the required time and study to fulfil the minimum graduate prerequisites. While this condition will doubtless improve, because many of the courses which are unacceptable for admission to graduate status in the universities are no longer operative, special graduate courses for practitioner training predominate at present.

These special graduate courses are usually less comprehensive and more elementary than graduate courses in other departments of our universities. Technical training too often consumes the largest share of the student's time. Particularizing for the moment, one may reasonably oppose the inclusion of many widely accepted orthodontic laboratory exercises in graduate courses. In addition to the required study in related fields of knowledge, the technical proficiency which we have extolled for so many years could readily be obtained by prosecuting original investigations in the field of advanced orthodontic therapy. Such departure from rigid routine might bring deliverance from the incredible satisfaction with standardized modes of treatment for malocclusion of the teeth, and the widely attempted use of these methods for correction of extreme dentofacial deformities.

In discussing the adoption in 1930 of what is known as Curriculum II, preparing the undergraduate dental student for a practice which includes children and emphasizes the correction and prevention of dental anomalies, Dr. Lischer writes:

In a specialty as young and immature as orthodontics, the superior educational plan has not yet appeared; it is too early even to pretend finality; and those of you who have maintained an interest in the educational plans and ideals are not unacquainted with the shortcomings of all methods thus far proposed. Even our best plans fail sometimes; but, by subjecting our problems of dental educational procedure to academic scrutiny and guidance under university auspices, such experimentation is less likely to fail than the empirical methods from which we so recently emerged.

Unanimous agreement on methods may

15. Noyes, F. B.: Undergraduate Teaching of Orthodontia, D. Cosmos, 72:514 (May) 1930.

16. Read before the alumni society of University of California College of Dentistry, 1932.

never be achieved and is probably unnecessary. . . . Minor details, like the content of a laboratory course in technic, or the most opportune time for a student to begin clinical practice, or the most appropriate method for treating a given kind of anomaly—these and many more—will long remain for discussion and adjustment.

In view of the graduate instruction in orthodontia at the University of California, this experiment of giving a special curriculum in orthodontia for the undergraduate student is perhaps not so opposed as it may appear to the policy of the dental school of New York University, concerning which Dr. Stanton writes, in a letter from which I have already quoted:

An adequate undergraduate course would require two full years. It is obvious there is no available time. Even if it were possible to obtain a two-year allotment, it would still be inadvisable to teach the subject to an undergraduate.

We feel that orthodontia bears the same relation to dentistry as surgery, ophthalmology and otolaryngology bear to medicine, i. e., these specialties should be postgraduate courses whose graduates should then pass the examining boards created by the national organization of the specialties involved.

We have no such course at present, but are trying to formulate an adequate plan for the future. . . .

Our teaching to the undergraduate is based on the following premises:

The practice of orthodontia and pedodontia will be fused in the future and done in the same office.

The two major problems of dentistry, caries and dystrophies of the jaws, are intimately associated as to time of onset and possibly with a course on etiology.

Hence, our teaching to the undergraduate stresses the importance of getting every child into his office by 2½ years of age. We teach him how to care for the child's mouth, fillings, space retainers, etc., and to take periodic plaster impressions from which he will make record study models for observing growth changes. Our graduates are expected to develop a keen interest in occlusal problems by this self-educating process, i. e., a large series of study models, taken on the same individuals, will allow the discriminating student to observe growth changes and the self-correction or partial correction of certain malocclusions without appliance therapy.

As a result of this self-education, our graduates will take greater care in the selection of the orthodontic specialist to whom their patients will be entrusted. We hope, in the end, to obtain applicants for our postgraduate course from this group of graduates, who, for a period of time, have concentrated on the child. When this group applies for postgraduate orthodontic training, they will know plaster impression technic, model making, and the value of periodic record models. They will also be familiar with some of the normal and abnormal growth processes of the jaws.

If our reasoning is right, we should obtain by natural selection a homogeneous group well fitted to pursue postgraduate orthodontics owing to their intimacy with some of the basic problems with which they have already familiarized themselves.

Earl G. Jones, of Columbus, Ohio, in a paper on postgraduate education in orthodontia,[17] remarks the better preparation of the present-day dental student in entering the field of orthodontia. He believes that the early teachers of orthodontia unduly stressed the difficulty of the subject because they dealt with students who had far less preparation than the student of today. He writes:

A constructive criticism might be that we teachers of orthodontics do not appreciate that, in this enlarged plan of dental education, the subjects of biology have been amply taught; the biologic sciences of orthodontia are the biologic sciences of den-

17. Jones, E. G.: Review of Postgraduate Education in Orthodontia, J.A.D.A., 20:816-822 (May) 1933.

tistry. It is a waste of time to review these courses except to show their relation to orthodontics, and part of this can be done by the teachers of the various sciences if their attention is directed to the application of their subject to orthodontia.

As for technic, a much stronger course can be formulated.

He calls attention to the advantages of graduate over postgraduate study in orthodontia, and thinks that the most advantageous time to pursue special training is immediately after graduation. He is not in favor of completing any specialized training in the period of undergraduate study, but believes that a sufficiently strong course should be given to enable the student to appreciate at least some of the minor problems of orthodontic practice. The greatest drawback to teaching and proper clinical supervision with which orthodontic education has to deal, he believes, is insufficient money for salaries for teachers. It is Dr. Jones' opinion that though the short term postgraduate courses have filled an important rôle in orthodontic education, they have served their purpose; that, with the increase in time given to dental education, the undergraduate student can be given as much training in orthodontia as the postgraduate student formerly gained (a point made also by Dr. Lischer of California), and that this knowledge should be sufficient to enable him to care for minor cases requiring orthodontic treatment. The man who wishes to devote his entire time to the practice or teaching of orthodontia, he believes, should spend at least one year in special study of the subject. He concludes:

Just as dentistry has progressed from private schools to become integral parts of our universities, so will orthodontia advance from short term courses of postgraduate schools to graduate courses of the graduate college.

In a letter describing the courses at the University of Illinois,[18] Allan G. Brodie points out some of the fundamental defects and difficulties of orthodontic education. He writes:

I believe that the manner of presentation is far more important than is the show that it makes in the catalogue. It is useless or foolish to force a man to spend one quarter of a year in the review of anatomy if he is not going to get any more out of it than he obtained as an undergraduate, and this same thing goes for any other subject. The ideal toward which we are striving at Illinois is to give the students a minute and thorough grounding in the sciences that are fundamental to orthodontia and further than this to place in their hands the methods of utilization of this material. Factual anatomy is of no earthly use to the student until he begins to apply it to the problems in hand, and for this reason there are practically no lectures given, but plenty of quizzes and seminars. We are seeking to turn out not only creditable clinical performers, but also performers who know the significance of fundamentals, who have a decent background of knowledge of the scientific approach so that they may evaluate advances made in the profession. In addition, we recognize the awful handicap under which dental education and orthodontic education are laboring through the want of well trained teachers, and each man is required to prepare some course, photography for instance, which he must give to the instructor and to his classmates. To do this, he must look up his material, organize it, prepare lectures, give assignments and finally conduct examinations.

Clinically, we believe that the graduate department should be run as a teaching clinic—not a service clinic; hence, only those cases are taken that are of teaching value. We also believe that it is far better that a student treat a very small, well selected group of cases and carry them through to completion than it is to expose him to a great mass of clinical material over which he has little or no control and

18. Personal communication to the author.

> much of which has been handed on to him from a preceding class. I think the latter custom has ruined more orthodontic departments than any other single factor. We require that a student treat not less than four nor more than six cases. . . .
>
> I am kept wrought up constantly by the fact that the promises in the catalogues are seldom fulfilled in postgraduate courses and it becomes daily more apparent that it is not so much a matter of what you give a student so far as quantity is concerned as it is the quality of what you give them and how you give it to them. From what little experience I have had . . . I should say that undergraduate dentistry as it is taught now is one of the poorest foundations upon which to build a true concept of the subject of orthodontia.

Though, as Dr. Lischer writes, orthodontics is still too young a specialty to permit us to say with any finality what the best educational plan is, I believe the best opinion of the present would agree on the following points:

1. The undergraduate student should be given a knowledge of the basic sciences, which serve as a necessary foundation not only for the study of orthodontia, but for other dental specialties as well. He should be given a point of view concerning orthodontia and a realization that it requires thought and technical ability, as Dr. Noyes writes. He should study the principles with reference to the development of the human denture so that he will not create malocclusion. No undergraduate student should be given a case of malocclusion to treat.

2. The student should prepare for orthodontic practice through graduate work. My own belief is that this course should cover two years, the first year to be devoted to study and observation in the clinic, the second year to an internship in the clinic. At the end of the two years, the student would be eligible for a degree from the graduate school of the university.

3. Short courses should be given, but only for graduate orthodontists who wish to "brush up" on new technic or theory. Such "refresher" courses are given at the University of Toronto, according to a statement made by C. Angus Kennedy in discussing the paper of Dr. Jones on postgraduate courses. The present type of short courses for producing specialists in orthodontia should, I believe, be done away with.

The time is now ripe for orthodontic educators to confer and come to some agreement on a definite and uniform plan for postgraduate and graduate study in this field.

MOUTH SURVEY AND DESIGN OF PARTIAL DENTURES*

By F. EWING ROACH, D.D.S., Chicago, Ill.

IN the production of partial dentures, there are several important steps: mouth survey and design, the impression and fabricating of the appliance and its installation in the mouth. This is the order in which these major steps are taken. My discussion will deal primarily with mouth survey and design.

When a patient requires a partial restoration, the first problem is to determine the type of appliance to be employed. In order to make this determination, we examine the mouth first with reference to any pathologic condition that may exist. Should disease be found, a diagnosis is made. Further examination becomes a survey and since this has to do with living tissue and mechanical structures as well, it is a bio-engineering problem.

It is a question in many cases whether to employ the fixed or the removable type. The choice in many instances is based on personal preference rather than proven principles and methods.

Granting that there is a large field for the fixed bridge, there is no question that many fixed bridges are placed where some form of removable is indicated and vice versa. With the splendid materials and equipment at our command and a more comprehensive understanding of the principles of clasping teeth, we are today able to compete more successfully with the fixed bridge in comfort and length of service than ever before, and with the least possible mutilation of the natural teeth in preparation.

While it is true that the modern fixed bridge calls for less tooth mutilation than in former years, it nevertheless calls for mutilation too extensive for placement of these bridges to be followed as a universal practice.

Another form of restoration is the bridge which is anchored by means of precision attachments. Mutilation of teeth for this type of appliance is equal to and often more than the fixed bridge of today, and offers few advantages. While I produced a semiprecision attachment many years ago, I seldom used or recommended its use on teeth not in need of repair. Today, with our improved forms of clasps, its employment is still further limited. The rigid type of precision attachment has had its day but is rapidly losing its popularity. It has some virtues, but its vices are too great for its future existence.

There is also a place for the partial plate which has no visible means of support or anchorage other than the saddle areas covering the mucosa.

More than forty years of careful observation and experience has led me to believe that when partial restorations are to be made, the modern clasp affords the most conservative and the most nearly universally applicable means of anchor-

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 10, 1933.

age, with an equal chance of longevity and efficient service to that of any other method. We see few cases today that cannot be successfully anchored with some form of clasp. The clasp is the oldest and most used of all means of anchorage, and as time goes on, it gains in favor. Recent improvements and refinements have greatly enhanced its usefulness, and many of the objections found in the old orthodox buccolingual and labiolingual clasps have been removed. Clasps have been responsible for a lot of damage, and yet they have served us well through all these years of abuse and misuse.

During the past five or six years, it has been my privilege to meet many hundreds of dentists in postgraduate work, and it really is pathetic to see how little is known of the simplest fundamentals of clasping teeth.

In order that I may establish a premise for some of the designs to be shown later, permit me to offer once more the four fundamentals of clasp design: retention, reciprocation, stabilization and fixation.

The prime requisite of a clasp is to hold or anchor the appliance to place in the mouth, which means of course that free-end flexible terminals of the clasp must engage an undercut or a plane surface parallel to another surface, in order that friction may serve in lieu of the undercut.

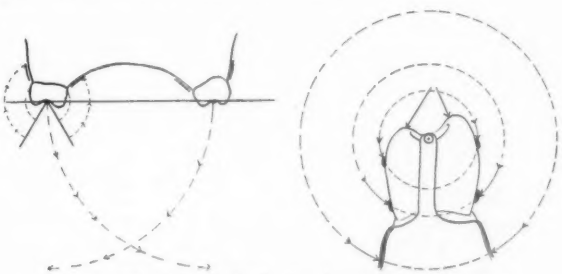

Fig. 1.—Direction of tipping tendency in bilateral case.

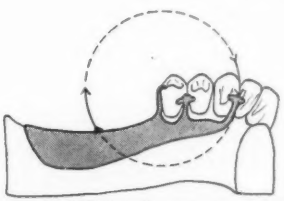

Fig. 2.—Stabilizing leverage varying with bearing distance from occlusal rest.

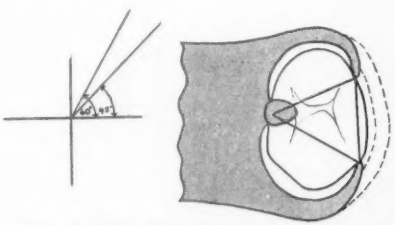

Fig. 3.—Direction of tipping tendency in cantilever appliance.

The anchorage of the precision attachment depends on the friction created by the spring tension between one part of the attachment and the other. In most attachments, these are parallel surfaces, the ball and socket being an exception. The clasp in most instances is a more positive form of retention in that the free end of the clasp passes over a convexity into a more constricted area gingivally.

By reciprocation, we mean that all spring bearings of clasps must have reciprocal bearings on the opposite side of the tooth or teeth being clasped. The lack of this feature is the cause of much damage to the anchor tooth.

"Skoliodontic" movement of the teeth is inevitable, resulting in traumatism, loosening and ultimately loss of the teeth so clasped. Stabilization of these restorations depends in the main on the correct distribution of the direct and the indirect retainers.

In other words, the teeth to be clasped are selected so that a line drawn from one to the other will pass as nearly as possible through the center of the appliance. When this is not possible, the appliance should be extended laterally to this line, balance or stability being thereby given to the case.

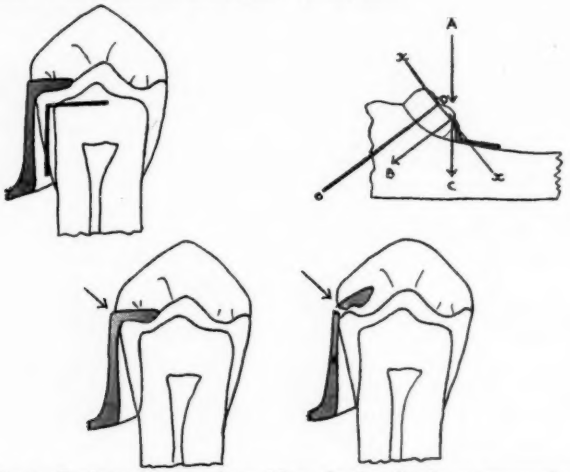

Fig. 4.—Reciprocation varying with angle of occlusal rest preparation.

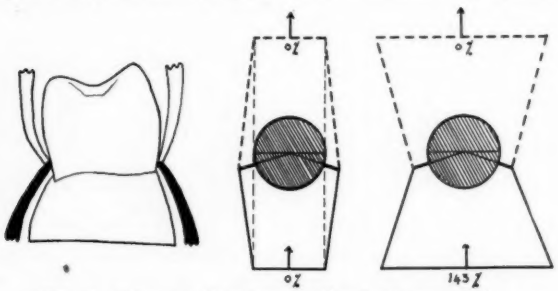

Fig. 5.—Correct and incorrect occlusal rest preparations.

The fourth feature is fixation. I do not mean fixation as applied to fixed bridges, but I do provide for means of as positively and permanently maintaining a fixed relation of the appliance, teeth and tissues.

The bar clasp, the mesiodistal, the

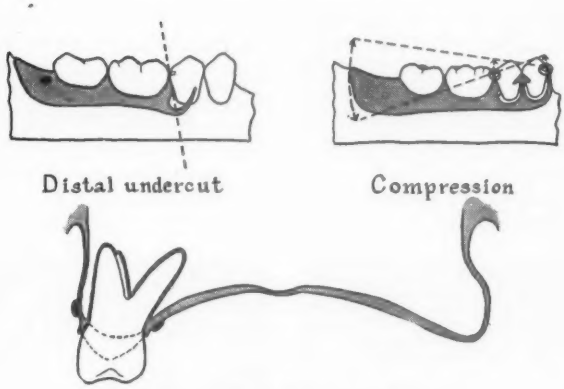

Fig. 6.—Relative efficiency of clasp approach.

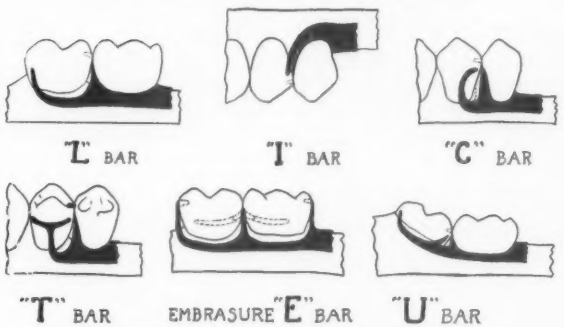

Fig. 7.—Bar clasp types.

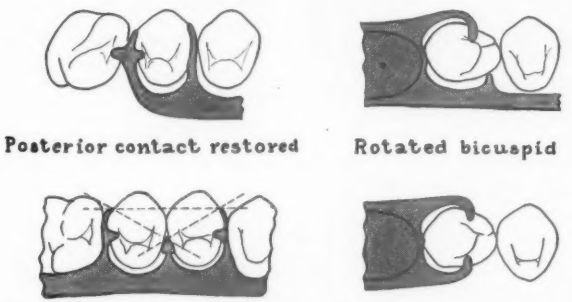

Fig. 8.—Embrasure clasp on bicuspid and compound mesiodistal clasp on two bicuspids.

embrasure grip and the truss bar types form an important part of the designs.

Assuming that most everyone is more or less familiar with these three clasps, I will at this time refer only briefly to some of their outstanding features, their indications and advantages.

The bar clasp may be used anywhere in the mouth, but is practically limited to clasping molars and bicuspids, though it is especially valuable on lower cuspids.

With the five typical bar clasps (T, U, L, I and C), we are able to clasp almost any tooth regardless of contour or position.

The variability of design of the bar clasps makes it possible to engage the most desirable areas of the teeth regardless of where they are located. It minimizes tooth contact; has a firmer yet more flexible grip, less interference with excess convexity and malposition, wider range of adaptability and greater stability, and is less conspicuous. Another important feature of the bar clasp is its approach to the tooth. Because it engages the tooth with a push rather than a pull contact, its grip and stabilizing effect are greatly increased. In substantiation of this last claim, I refer you to an article by E. R. Stone,[1] who makes a comprehensive analysis of the physics of clasps

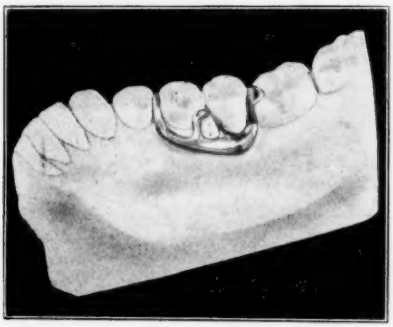

Fig. 9.—Unilateral, one tooth replacement.

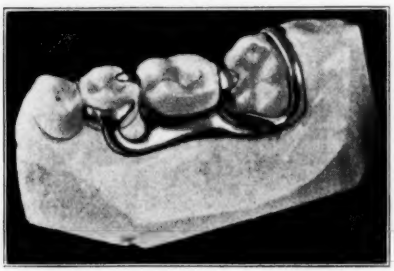

Fig. 10.—Malposition of abutments increasing difficulty of clasp design.

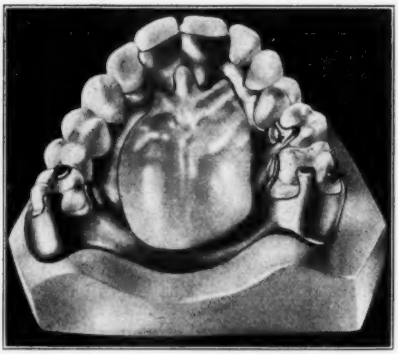

Fig. 11.—Unusual bilateral design.

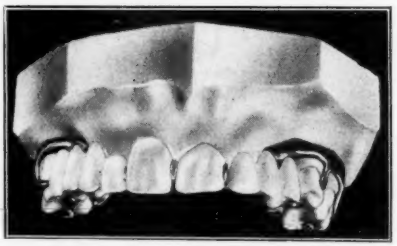

Fig. 12.—Labial view of case shown in Figure 11.

1. Stone, E. R.: Tripping Action of Clasps, D. Cosmos, 74:960 (Oct.) 1932.

and shows conclusively some of the advantages of the bar clasp over the old orthodox buccolingual clasp.

This plan of clasping has been combined with truss bars and continuous rings, and as projections from palatal and lingual bars or from any place on the appliance that may be advantageous. The reverse C bar has been employed with

Fig. 13.—Bilateral restoration of unusual design.

gratifying results in reconstruction cases.

In the design of clasp cases generally, permit me to offer some suggestions: In making an examination, carefully observe the teeth with reference to susceptibility to decay. Be sure that all enamel surfaces to be touched by clasps are in sound condition. Keep in mind the areas of susceptibility and avoid contact with these surfaces as much as possible.

Make preparations for occlusal rests before and not after the case is finished. It is better to fit the appliance to the patient than fit the patient to the appliance.

When possible, make unilateral cases: they are usually more acceptable to the

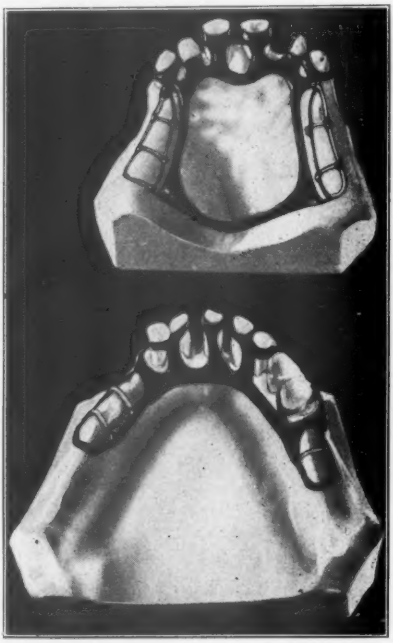

Fig. 14.—Immobilization of abutments preventing their traumatization.

patient, and the bar clasp makes this type of case more practical. With favorably shaped teeth, not too long a span and normal occlusion, many bilateral cases may be made with success as unilateral. When in doubt, bilateral cases should be built.

When making extension (cantilever)

cases, increase the saddle area and decrease the size and number of teeth supplied. This will minimize the leverage and thereby increase efficiency and make for longer service and greater comfort. Under no circumstances is it necessary or advisable to supply the full complement of teeth. If in doubt about balance, use stabilizers. A case out of balance will be annoying to the patient and probably cause unnecessary damage.

so often present in the region of the lower anterior teeth.

Preference should be given to small duplex bars across the palate in maxillary cases, one being placed at the juncture of the hard and soft palate and the other just back of the rugae or along the lingual surfaces of the teeth, crossing the gum line and terminating in the groove which is usually present about one eighth inch away, affording relief at

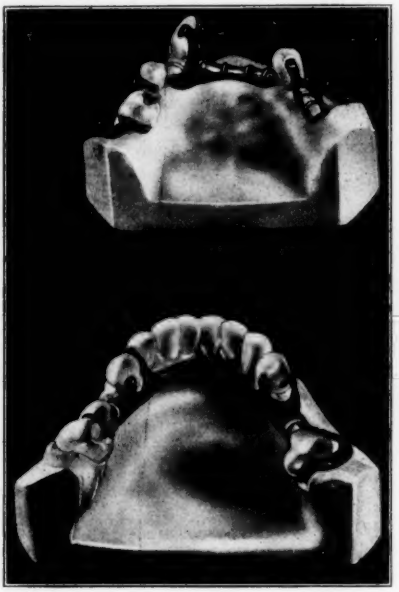

Fig. 15.—Additional cases of malposed abutments. Compensation by correct design prevents further destruction.

Fig. 16.—Malposition of abutments requiring unibar construction.

Under no circumstances should the appliance be allowed to impinge on the gingival margin. Never terminate a case with sharp edges at or near the gingivae. It is better to lap onto the teeth or keep at least one-eighth inch away. Lingual bars should be kept out of the undercuts, the gum margin. Avoid crossing hard raphae at the median line.

The character of the tissues and direction of the masticating forces indicate the need for compression of saddles on the palatal side and minimizing impingement on the buccal side of the ridge.

In the installation of removable appliances, the greatest problem is stability. This is especially true in unilateral cases. Figure 1 shows the direction of the tipping tendency in these cases. The occlusal rest is always the center of rotation, and the impact of the occlusal forces has a tendency to tip these appliances buccally and lingually. To overcome this tendency, rigid points of bearing should be placed as near the gingival margin of the enamel as is possible. By means of the various types of bar clasps, this can be accomplished much more effectually than by the old type. Figure 2 illustrates the relative amount of leverage that can be

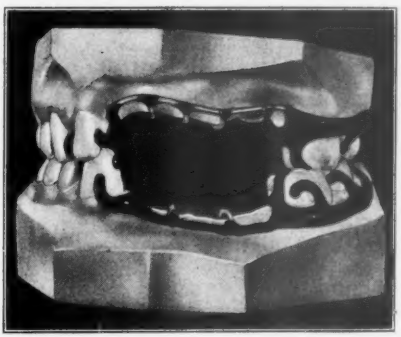

Fig. 17.—Accidental loss of anterior teeth necessitating extensive restoration.

employed in unilateral cases to overcome this lateral tipping.

Another major difficulty of stabilization is seen in extension saddle cases. The occlusal rest again becomes a pivotal point, and it is self-evident that stabilizing arms should be used to keep these saddles in place. Figure 3 illustrates this condition.

The rule with reference to occlusal rests is to cut away the marginal ridge so that the surface for the occlusal rest will assume a rather rounded, saucer shape, as nearly at right angles to the long axis of the tooth as is possible. Figure 4 shows the vertical line representing the long axis of the tooth, and the horizontal line at right angles. When it becomes necessary to vary this occlusal rest preparation 45 degrees or more, it is very important that the points of bearing of the clasps, or some part of the appliance itself, be so designed that it will give a firm, rigid

Fig. 18.—Lingual view of case shown in Figure 17.

support against the opposite side of the tooth, to prevent its sliding down gingivally on these steeply inclined planes.

Figure 5 shows the correct and incorrect form and position of the occlusal rest, illustrating also the weakness in occlusal

rests where the marginal ridge is not removed. Occlusal rests should be at right angles to the long axis of the tooth, regardless of angle. Assuming the occlusal force to be in the direction of *A* and *B*, the strain on the tooth will be less than if the occlusal rest were prepared at right angles to the line of force.

Figure 6 illustrates the difference in approach of the bar clasp and the old orthodox clasp to the point of contact on the tooth. The dark lines show the approach from the gingival aspect, as in the case of the bar clasp. The light lines show the approach as in the case of the orthodox clasp. The accompanying diagrams show the relative efficiency of the two types of clasps. These illustrations are taken from Dr. Stone's article mentioned above. According to his findings, the bar clasp is 143 per cent more efficient as a retaining means.

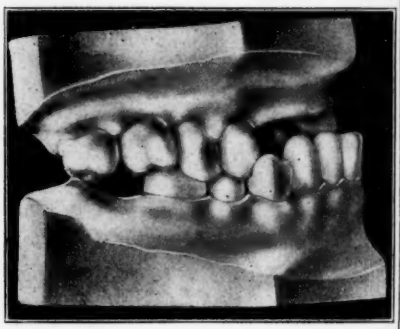

Fig. 19.—Case of malocclusion.

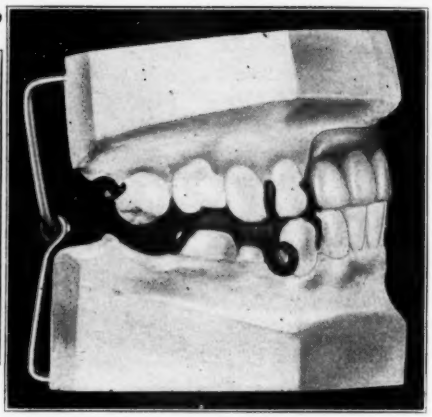

Fig. 20.—Restoration of case shown in Figure 19.

Five distinct types of bar clasps and a truss bar embrasure clasp are shown in Figure 7, and Figure 8 shows two additional variations in the bar clasps, adapted to rotated teeth. An embrasure clasp is illustrated on a bicuspid, and a compound mesiodistal grip for use on two such abutments.

The remaining illustrations show the application of the foregoing principles to practical cases. Figure 9 is a view of a unilateral case supplying one tooth, with C bars on the distobuccal and lingual aspect of the second bicuspid. A continuous embrasure bearing crosses between bicuspids, and there is an occlusal rest on the molar. There are no undercuts on the molar, nor were there any on the mesial aspect of the second bicuspid. Consequently, this case could not be made successfully with the old orthodox clasp.

In Figure 10, a unilateral case is illustrated wherein the molar is tipped badly mesially and lingually. There are no undercuts whatsoever on the distal nor on the mesial aspect of the bicuspid. C bars were used to engage available undercuts on the distobuccal aspect of the bicuspid and mesiobuccal aspect of the molar. A C bar was also used on the mesiolingual aspect of the molar, engaging the undercut in this area. A T bar was used on the lingual aspect of the bicuspid, the distal wing engaging the undercut for retention, and the mesial wing serving as a reciprocal bearing, and also providing additional stabilization.

Figure 11 is an illustration of the occlusal and lingual view of an upper bilateral case, showing anchorage to central incisors with a compound mesiodistal grip, a continuous truss around the right molar, and C bars on the mesiobuccal and lingual angles. No undercuts were available on the distal aspect of this tooth.

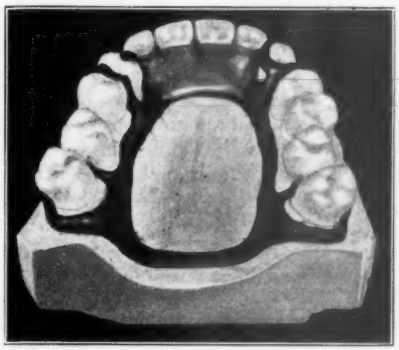

Fig. 21.—Palatal view of Case shown in Figures 19-20.

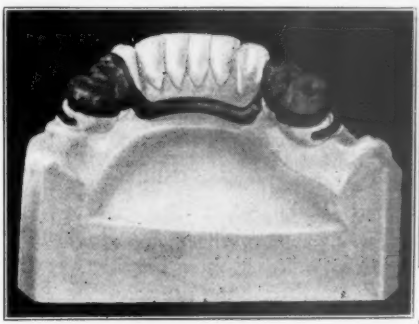

Fig. 22.—Lingual view of lower appliance.

A continuous truss around the second bicuspid and first molar on the left side, with a C bar on the distobuccal and mesiolingual aspect, and an I bar on the distobuccal aspect of the bicuspids completed the clasping arrangement.

In Figure 13, a model of a case is shown with all teeth back of the central incisor on the right side, and from the first bicuspid to the first molar on the left, missing a compound mesiodistal clasp on the central incisors, a combination mesiodistal clasp and an L embrasure between cuspid and first bicuspid and a continuous truss with C bars on the disto-

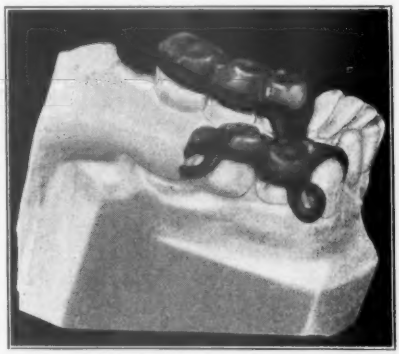

Fig. 23.—Another view of appliance shown in Figure 22.

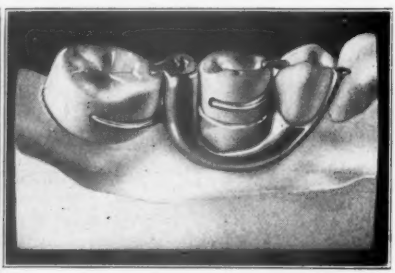

Fig. 24.—Monstrosity of design recently secured.

buccal and lingual angles of third molar, comprise the clasp assemblage for this case. Duplex palatal bars were placed, one crossing posteriorly to the hard raphae at the median line, and the other crossing in the region of the rugae.

Figure 14 is a skeleton design for combination of gold and condensite for

both upper and lower cases. These cases afford a remarkable opportunity for showing the efficiency and acceptibility in appearance of the mesiodistal grip clasp.

Figure 15 illustrates two cases with malposed abutments. Elimination of lingual bars, and clasp approach from one side of the abutments only, is frequently required to permit insertion of Roach appliances. An illustration of another such case is shown in Figure 16. All the remaining teeth are inclined lingually. Unibars were employed on molars, and C bars on the distobuccal aspect of bicuspids.

Figure 17 is an anterior view of a case wherein all of the anterior teeth, both upper and lower, were lost through accident. Another view of this case is shown in Figure 18. The continuous truss bars on the molars, in conjunction with bar clasps engaging the available undercuts, made it possible to anchor the appliance successfully. This could not have been done with the old conventional clasp.

A case of malocclusion presenting considerable difficulty, in which the patient had a very pugnacious appearance, is shown in Figure 19. By opening the bite about 2 mm. and jumping it about the same amount, a very pleasing result was obtained in both appearance and efficiency. The restoration is shown in Figures 20 and 21. As indicated in Figures 22 and 23, the reverse C bar lends itself admirably to the anchorage of these reconstruction cases. The bite opening was accomplished by building the appliance across the occlusal surfaces of the molars and bicuspids in the lower, and raising to the desired occlusal relations with the upper. This restoration is removable, of course, and should be used with caution. Its large occlusal tooth coverage would naturally invite decay if the patient should not keep it scrupulously clean.

Among the peculiar designs one sees, a picture of rare monstrosity in my collection is shown in Figure 24. In this case, two precision attachments, two occlusal rests and two clasps were employed to anchor the small gold dummy between a gold crown on molar and bicuspid.

DENTISTRY'S PLACE IN CHILD WELFARE*

By GUY S. MILLBERRY, D.D.S., San Francisco, Calif.

ASSUMING that "dentistry" as used in the title, "Dentistry's Place in Child Welfare," implies dental health service, one might place it fourth in the order of importance in child welfare, categorically speaking, since society decrees that food, clothing and shelter take precedence in any welfare program, even though medical care, of which dentistry is a part, often prevails over all of these, when illness develops.

If we accept the frequency of occurrence of physical defects or diseases as a criterion for placing dentistry in a child welfare program, we might well list it first in order of importance, since it is usually found to be the most prevalent. Arbitrary placement seems unnecessary. We should not be especially concerned with the position which dentistry should

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 11, 1933.

occupy, but with the good which it can do.

Suppose we define child welfare by stating rights and privileges. This is well done in the Children's Charter, issued by the White House Conference on Child Health and Protection. Dentistry is mentioned in simple, direct language in Article V, as follows: "regular dental examinations and care of the teeth." The other phases in Article V are not pertinent to dental health service, but we should be familiar with them. "Regular dental examinations and care of the teeth" must include more than a periodic visit to the dentist. It necessitates an understanding of the nutritive elements required for the growth of the teeth and for the prevention of caries and it demands enough personal interest and attention to insure a sound dentition. The objective to be attained in dental health is sound teeth and a healthy mouth throughout life.

This dental objective has been before us for many years, yet apparently it is not appreciated by parents or dentists, since the incidence of dental decay seems to be rising. W. McKim Marriott, dean of the Medical School of Washington University, St. Louis, has stated[1] that the dentists are not coping with the problem of decayed teeth, since all reports show an unvarying average of five or six decayed teeth in the mouths of all children.

An examination of 6,712 school children in the second grade of the public and parochial schools in San Francisco[2] showed 21,949 deciduous teeth and 8,334 permanent teeth decayed at this age level, an average of 4.5 teeth per child.

In February, 1933, 100 pupils in a junior high school in San Francisco were examined. The average number of decayed teeth per child was found to be 6.32 and the average number of cavities 8.37. The teacher reports, "These children come from better class homes. I can imagine many districts in the city where the teeth condition would be much worse."[3]

These children range in age from 12 to 14 years. They are well fed and well clothed, yet neither they nor their parents seem concerned with a condition which is deplorable and which will undoubtedly result in impaired health before maturity is reached.

The simpler dietaries forced on the people by the existing economic conditions during these past four years, which are reported to have resulted in improved general health, do not apparently inhibit the decay of the teeth, though it has been shown that dental caries may be inhibited in from ten to twelve weeks, and that it may be actively induced in about the same period of time, simply by altering the diet. In discussing this question recently, C. L. Drain spoke of this as a problem of nutrition and stated that it should be dealt with as such.

Is it not strange that all this information makes so little impression on the dental profession and on the public? Evidently we must find a new line of approach, if the objective that we have set up is to be reached.

I submit the thesis that dental health service and instruction should have a place in every child welfare program. You cannot teach a sick child; he must

1. Marriott, W. McK.: Unpublished lecture given before the students and faculty of University of California Medical School, Aug. 26, 1932.

2. West, F. T.: Tabulated Findings of Examination of Children of Second Grade of the San Francisco Public and Parochial Schools, J. California D. A., 9:61 (March-April) 1933.

3. Unpublished report of work done at Roosevelt Junior High School, San Francisco, February-June, 1933, by Agnes Busjaeger.

be well before he can readily acquire knowledge. Therefore, health service and instruction should be a part of his education. His recreation is interfered with if he suffers from a toothache. His growth may be stunted and important organs may be permanently impaired if infected teeth are not treated or removed.

If this thesis is acceptable, how shall we proceed to formulate the necessary service and instruction into a program? May I suggest an age level plan, arbitrarily establishing six groups and laying down general principles for dental health instruction and practice for each?

The following age periods are proposed: (1) prenatal; (2) birth to 3 years; (3) 3 to 6 years; (4) 6 to 12 years; (5) 12 to 18 years; (6) 18 to 24 years.

THE PRENATAL PERIOD

Since the teeth begin to grow early in fetal life and their growth is dependent on the nutrient material derived from maternal sources, we should concern ourselves with the food of the expectant mother, not because such supervision falls within our province, but because we know that diet affects the teeth and that the medical schools to date have not given adequate instruction on this phase of the care of the mouth and the development of the teeth. For this reason, medical practitioners are usually indifferent to the problem.

Within the limitations of our own sphere of activity, we should serve as advisers to the family doctor or the obstetrician during this time. The family physician is so engrossed in a wide divergence of activities that he cannot or does not give reasonable attention to dentition, and the obstetrician is concerned chiefly with getting the baby into the world sound and well and with helping the mother through the period without too great a sacrifice of health and strength.

Serving as advisers requires that we have knowledge of the growth and development of the teeth and jaws and the nutritional elements that are necessary to build these tissues well, and as much information regarding the influence and function of the endocrine glands and the effects of calcium in the blood stream and on the nervous system as is generally available. All of these phases are still being studied and developed. We should keep in touch with competent teachers and research workers or consult with them on specific cases. Dependable advisers are not to be found, as a general rule, among nutritionists and dietitians, whose training and experience have been gained in the diet kitchen or home economics departments, but rather in the class rooms and laboratories of our medical schools, where dietary therapy is being applied to the pathologic problems of human life. Much authentic information is at hand, if we will take the trouble to look for it.

We will find the volume on nutrition compiled by the Committee on Growth and Development, Section on Medical Care, of the White House Conference on Child Health and Protection[4] a very dependable source of information.

FROM BIRTH TO THREE YEARS OF AGE

Our relations with the infant as a patient are usually only indirect. With the eruption of the teeth, the only exoskeletal structures in human beings make their appearance. Unfortunately, we are inclined to view them as having no definite biologic relation to other osseous structures of the body, and we do not interpret their condition as a symbol of good health

4. White House Conference on Child Health and Protection; Growth and Development of the Child; Part III Nutrition, New York City: Century Company, 1932.

or poor health in other parts of the body.

We are sometimes called on to render professional service to the infant. At this tender age, under 3, the technical operations as a rule are simple. But, as this is one of the most impressionable periods in the child's life, the manner in which we render this service may determine whether he will go through life with a good dentition. The service itself is usually but an incident; but our knowledge of child psychology should be adequate to enable us to create a proper attitude in the child's mind toward dental service.

The place which dentistry should occupy in child welfare in these two age periods has not been sufficiently emphasized in most of our dental schools. It is no wonder that it is neglected in practice.

FROM THREE TO SIX YEARS OF AGE

At present, dentistry finds an excellent opportunity for constructive service in child welfare during the years from 3 to 6. Children are most responsive to suggestion then. They imitate and emulate through a desire to be "big men" or "like mother." They wish to be grown up. Older children are chosen by them as leaders or ideals.

Dentists rarely take advantage of this mental attitude because, first, they are not interested as a general thing in preventive dentistry, at the period most opportune for its inauguration and, secondly, they rarely see a child unless they solicit his clientage.

This age period is the most desirable field in children's dentistry, if one seeks a harvest of good health standards as a reward.

FROM SIX TO FOURTEEN YEARS OF AGE

From 6 to 14 is a period when children are "just kids," subjected to new environments in school and play and influenced largely by the emotions. The foundations of training for their work in life, of which we can foresee so little, are being laid. It is a period of discipline. Regular home care of the teeth must be enforced and such professional instruction and service as is necessary to sustain the dental objectives must be given.

Environmental conditions which are not corrected frequently break down the worthy ends for which the dentist is striving. Some of these conditions result in poor nutrition. The importance of dietary factors cannot be overemphasized because their effects are so far reaching and good results are so easily attained.

The eruption of the permanent teeth occurs during this age period and parents and dentists should be especially watchful for tendencies toward deformities, especially those which may be hereditary. Deformities should receive corrective treatment.

This is probably the most trying age level of all. Pride in personal appearance makes only intermittent appeal to the child's interest. Recreation and school are his major concerns, and any health service activity that interferes with these will not secure his cooperation. Habits formed during this period will probably be lifelong and the dentists should be deeply concerned with their establishment.

FROM FOURTEEN TO EIGHTEEN AND FROM EIGHTEEN TO TWENTY-FOUR YEARS OF AGE

While the 14-18 and 18-24 age levels are not usually included in the child welfare program, I cannot forego an opportunity to mention them briefly. They come within the scope of formal education. The child is obliged by law in some states to attend school until he is 18, and he may choose a college course as the last stage in his education program.

It is desirable that dental service and instruction in mouth hygiene be continued

through these periods, largely because the first group, and frequently the second, are still dependent on parental support and counsel, and they should not be allowed to leave the family home with the handicap of dental deficiencies.

Sometimes marriages occur at the second of these age levels; and, when children are born, it is but natural that the young parents should insist on having them cared for after the manner of their own experiences. This will be true of dental service, if the type which has been rendered has been such that two decades or more of comfort and satisfaction with sound teeth and a healthy mouth have given every assurance that such conditions will continue to the end of life, provided instruction is followed carefully.

When we realize how little we are able to teach of personal hygiene, the prevention of disease and the maintenance of health through advice given during office or clinic visits, and we compare this with the knowledge gained by studious application to a given subject for five periods a week through several years, we should not be surprised that our efforts have been of so little avail. The reason our mouth hygiene program in the schools is not so good as other health or mental training is that it is not, except in Hawaii, a real part of the curriculum, as reading or mathematics or physical education is.

The problem, then, seems to be either to help the parents to learn what should be done for the children dentally, or to help the children to learn how to care for and save their teeth. It includes also provision for, when the need arises, dental service that will be within the reach of all purses.

Were I to propose a plan purposing to place dentistry in the child welfare program where it would do the most good, dental care and instruction would become a requirement during the years of compulsory education. The dietary regimen would be as definitely prescribed as it is in cases of diabetes or tuberculosis, in which good results are dependent almost wholly on the nutritional program. And both diet and hygienic care would be as carefully enforced as is the truant law in routine school attendance. It would be made as acceptable as the most modern form of health service can be, with every effort bent toward the preventive phases, thereby eliminating dental decay, as far as possible. It would be within the reach of all self-respecting people who desire to meet their obligations in life and who desire the happiness and contentment that only good health can bring.

How shall we place dentistry in the child welfare program? Surely not by organizing and developing a service and an educational program independent of all other related activities.

The dental problem is a factor in every child's life. Of the four sections at the 1929-1931 White House Conference on Child Health and Protection, medical service, public health service and administration, education and training and the handicapped, three accepted or sought data on dental education or service or both and one was rather indifferent, believing that medical service should include necessary dental care. If we accept the proceedings of this conference as a guide, dentistry should have a place in every child welfare program.

The problem of the crippled child received considerable attention, yet it was not held that a child with a serious dentofacial deformity, a bad case of malocclusion, might appropriately be classed as a cripple.

There are three phases of dentofacial deformity which seems to justify its classification as a physical handicap: 1. Irregular and uneven arrangement of the teeth often causes facial disfigurement.

2. Such disfigurement frequently results in a mental handicap because of the child's consciousness of his physical imperfection. 3. Malocclusion prevents proper mastication of food, which leads to gastro-intestinal disorders. It is sometimes the cause of speech defects.

It has been stated that a study of the mouths of persons past 50 years of age shows that, if there has been a normal arrangement of the teeth in childhood, it is quite probable that, with care, the teeth will last throughout life. The opposite is also true; that is, teeth which are irregular and uneven are predisposed to disease and early loss.

Reports as to the number of crippled mouths to be seen vary. Of 12,614 children examined recently, 43 per cent were found to have dentofacial deformities. A thorough examination of 2,982 university students revealed the fact that less than 5 per cent of them had fine even teeth.[5]

Ordinarily, we pay little attention to the mouth of a child, other than to observe its outer form and comment on it as "a pretty mouth," or otherwise. Few persons realize that the form of the whole face is dependent on the condition of the jaws and teeth, the foundation upon which are laid the musculature and other soft structures. Remove the maxillae and the mandible and there is no face left but the eyes; and their beauty is more enhanced by the structures below than those above. Most of the expression in the face can be traced to its lower portion. Therefore, it is desirable that the contour and symmetry of the jaws and teeth be given careful attention during the growth period.

If it be said that nature or heredity and environment control this growth, and that we can do nothing to modify it, let us but refer to the records of the orthodontists and the orthopedists to show that, with adequate care and guidance, much can be done to prevent or correct deformity.

The mouth and teeth are a relatively small part of the human body, but they are very important when the ingress of disease and the effect of oral disease on the whole system are considered.

To be acceptable and successful, the dental program must be integrated with all other child welfare activities. This means cooperation with all individuals—parents, teachers, physicians, nurses, the child himself—with all agencies, the government, the school, the church, the recreational organizations, and with every force which touches and molds the child's life and destiny.

Dentistry's place in child welfare will be firmly established only when all of these groups recognize that a child suffering from the results of malformation of teeth or oral disease of which toothache is only one phase and, despite its extreme discomfort, perhaps not the most important, cannot benefit in the highest degree from any of the efforts in his behalf. Most of all, the dentist must realize the relationship of his service to all phases of the child welfare program and prepare himself to enter intelligently into the work with sincerity of purpose and perseverance.

5. Orton, F. H., and Lischer, B. E.: Relations of Human Denture, J.A.D.A., 20:1553 (Sept.) 1933.

SOCIAL DENTAL SERVICE IN GREAT BRITAIN*

By A. E. ROWLETT, Leicester, England

IN presenting this communication, I am conscious of the honor done me as president of the dental organization primarily responsible for the inception of public dental service in Great Britain. It was in the year 1891 that the British Dental Association presented its first report on the teeth of school children, and the appalling conditions revealed in that report made clear the urgent need for the provision of some form of inspection and treatment by the state. A few years later, a member of the association, Cunningham, of Cambridge, was instrumental in setting up the first treatment center for the teeth of school children. This center, opened in 1908 by voluntary assistance, was shortly taken over by the city and has from that date blazed a trail which many other authorities have followed with success. The state realized the need for regular inspection and treatment and the necessary parliamentary sanction was obtained. Up to the outbreak of war, the school dental service developed slowly, but with the close of the war, a rapid extension took place, and there are now some two or three areas only which fail to make provision of this nature.

It will be seen that public dental service in Great Britain had its development in meeting the needs of school children, and it has now extended to include the treatment of the preschool child, the nursing and the expectant mother, tuberculous patients and other patients under the care of public authorities. In addition, a large section of the working-class population receives dental treatment as an additional benefit under the national health insurance acts.

It will be convenient to consider the various aspects of the foregoing in some detail under the appropriate headings. Before doing so, it might be well to clear the ground a little by considering the departments of state responsible. In Great Britain, cities, boroughs and county boroughs are responsible to the inhabitants within their boundaries for the provision of adequate facilities for education and health. In country districts, county councils bear these responsibilities. The state is responsible for ensuring that the local authorities properly discharge their functions, and moreover the state bears half the cost of these services.

SCHOOL DENTAL SERVICE

Education in Great Britain is directed centrally by the board of education, the minister having a seat in the government. The local councils of the various authorities enumerated above administer education locally on lines generally approved by the board of education. Parents are compelled by act of Parliament to obtain a satisfactory standard of education for their children, and this they may do either through private tuition or at state schools.

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 10, 1933.

Every child attending a state school is medically and dentally examined during its school life, but no provision is made for those children attending private schools.

The ideal at which the school dental service is aiming is to provide for the inspection twice a year of every child attending state schools; but unfortunately this ideal has only proved possible of attainment in certain isolated areas. The problem is, of course, entirely one of finance, and there is little doubt that the long looked for improvement in world economic conditions will be speedily reflected in the health service of Great Britain. All necessary treatment is provided and, in certain areas, orthodontic treatment is available.

The value of the school dental service has been proved in those districts where inspection and treatment have been available over a number of years, and the condition of the teeth of children leaving school bears adequate testimony to the care and high standard of the treatment provided. Unfortunately, much of the value of this excellent work is lost, owing to the fact that there is a gap between school-leaving age and the age when the young adolescent becomes eligible for dental benefit under the insurance act. The bridging of this gap is a problem which the dental profession has attempted to solve for a number of years, but without success. It is possible that the harm resulting from "the gap period" may be lessened by an extension of the school leaving age, which was projected recently under a socialist government, and a lowering of the age of entitlement to dental benefit.

HEALTH DENTAL SERVICES

The ministry of health and local town councils are jointly responsible for a number of services in connection with which dental treatment is provided. In an effort to reduce infant mortality and maternal mortality, centers were set up at which free medical advice was made available to expectant and to nursing mothers, as well as municipal maternity homes and infant hospitals. The necessity for eradicating dental sepsis in the expectant and nursing mother led to the provision of dental treatment, and, as a natural extension, dental advice and, where necessary, treatment was made available for children under school age attending such centers.

A difficulty arising in connection with these particular schemes lay in the fact that any female inhabitant was entitled to attend for medical advice, and, as the advice was of a specialist nature, the attendance was high. It followed that patients who could well afford to obtain the necessary dental treatment at the hands of their private dental advisers might obtain the treatment from the public dental clinics. This difficulty has largely been met by consultation between the dental organizations and the state, and only those patients who are unable to afford the services of a private practitioner receive treatment in the public dental clinics. Another difficulty lay in the fact that dental appliances were often necessary, and the provision of these appliances by public bodies at fees necessarily within the range of a lower working-class population has tended to reflect on the fees charged by private practitioners for similar appliances.

The treatment of patients suffering from tuberculosis, venereal disease and certain fevers, and also of mental defectives, is to a great extent a duty of health authorities, and, in connection with all such schemes, dental treatment is almost a necessity, and as such has a place therein. This treatment may be carried out either by part-time dentists or by a

whole-time officer, who would mainly devote himself to work in connection with the school and maternity dental services.

From the survey given above, it might appear that the various forms in which dental treatment is provided directly by the State in Great Britain would constitute a serious menace to the private practitioner. It is unfortunately true that, prior to the inception of such schemes, the class of the population to which they apply rarely, if ever, sought the services of a dental surgeon, save for the relief of pain. There can be little doubt that the services in question are exercising a very valuable educative influence on the working-class population, and that the next generation will value dental treatment to a much greater extent than the present. The great mass of the working classes, having neglected their teeth, offer little scope for true preventive teaching, but the agencies are devoting much time to the teaching of oral hygiene and care of the teeth by means of diet, and are concentrating on the children and adolescents who, as potential parents, may be trusted to inculcate sound ideas in the next generation.

An aspect which has not been dealt with concerns the expenditure of public money, and here it may be said that the annual expenditure for dental services in connection with the various public schemes referred to is small in comparison with the sums expended on health service generally. The practice with regard to payment for treatment received varies considerably in different areas. In some cities, a nominal charge is made for attendance at public centers; in others, the charge more nearly approaches the economic cost of providing the treatment; but in no instance is poverty a bar to obtaining the treatment, and every scheme has provision for free treatment when the patient falls within the necessitous class.

PUBLIC ASSISTANCE DENTAL SCHEMES

The maintenance of able-bodied paupers and the enfeebled pauper class, formerly a duty laid on boards of guardians, was, by the Local Government Act of 1929, transferred to local councils. Not only are large institutions maintained for the reception of this class of the population, but also hospitals and residential homes for children. As may be imagined, dental treatment is a necessary provision under schemes of this nature. This treatment, as part of the function of local councils, is tending to become an additional duty of the public dental officer, rather than that of private practitioners, as was the custom under the old guardians' administration.

The development of the service immediately following the War, with the many branches summarized above, has led to the creation of a definite career in the public dental service, and, at the same time, has tended to withdraw a certain amount of public work from the private practitioner. This has clearly been recognized by the profession in Great Britain, and, while the need for schemes of the nature described is readily conceded, and indeed the need for further extension of such schemes, it would be detrimental to the interests of the public and the profession if it were regarded by the state as the initial step toward a state dental service. The relationship between the state and the profession is discussed in the following paragraphs, which deal with the provision of dental treatment in connection with the National Health Insurance Act, and with the ideal scheme which has been prepared by the British Dental Association, and accepted by the dental organizations in Great Britain.

NATIONAL HEALTH INSURANCE DENTAL SERVICE

Prior to 1911, the working-class population of Great Britain rarely obtained medical advice and treatment at the hands of private practitioners except in case of urgency, or through the medium of sick clubs or friendly societies. Many of the latter had a proud record of public service; so also had the medical profession. Not a few physicians in working-class districts gave ungrudging attention in return for low fees or without fee.

Realization of the importance of health in industry and in the economic life of the state led the government of the day to introduce the National Health Insurance Bill of 1909, which passed into law despite opposition from the medical profession, employers of labor and, to some extent, employes.

The act provided (with certain exceptions) for the compulsory insurance of all employed persons between the ages of 16 and 65 in receipt of an income below a certain limit, and of all persons employed in manual work, without wage limit. The workers so insured were entitled to receive free medical attendance and treatment and a monetary allowance while incapacitated. The funds to defray the cost of the scheme were obtained by weekly contributions from the employer and employe and a grant from the state. The administration of the scheme was placed in the hands of the friendly societies, which for this special purpose were designated "approved societies," subject to the control of a department of state.

The funds of the approved societies were audited by government auditors every five years and, as had been anticipated, the first valuation disclosed a surplus over the whole scheme. By the year 1921, the surpluses which had accumulated allowed for the provision of other forms of treatment or benefit which were termed "additional benefits." It is important to emphasize that only the members of societies whose accounts showed a surplus were entitled to enjoy the advantage of additional benefits, and also that the rate of benefit payable varied from society to society.

The foregoing summary of the act will serve to make clear the fundamental difference between the provision of medical and dental treatment under the act, the former, a statutory benefit, enjoyed by every insured person as a right, the latter an additional benefit open only to those fortunate enough to belong to a society having a surplus.

Dental treatment, first introduced as an additional benefit in 1921, has undergone several modifications since that time, the present scheme having come into effect in 1930. The 1930 scheme provided for control by a statutory body, the Dental Benefit Council, consisting of an equal number of dentists and representatives of approved societies with certain officials of the ministry of health. The benefit is administered under regulations, at a scale of fees negotiated by the dental profession and the approved societies and sanctioned by the state. Each society providing the benefit undertakes to pay not less than half the cost of treatment, the balance being paid by the insured person; while the dentist undertaking the treatment agrees to make no additional charge, and to give a satisfactory degree of service.

The scale of fees, which need not here be detailed, includes among other items: scaling, 7s 6d.; extraction per tooth with local anesthetic, 2s 6d. (maximum extraction fee for either jaw, 12s 6d; both jaws, £1.2.6.); simple general anesthetic fee, 7s 6d.; prolonged anesthetic fee, £1.1.0.; full dentures, £5.10.0.

Insured persons entitled to the benefit

are provided with an estimate form, which is presented to the dentist of their choice. The treatment required is estimated by the dentist at the scale of fees and is submitted to the society concerned, and, in normal cases, is approved. The treatment is completed and the account paid. The society may, and frequently does, refer the estimate to a second opinion in the person of an officer appointed by the state. His duty is to advise the society as to whether the treatment estimated is, in his opinion, such as will secure the dental efficiency of the patient. Machinery is provided for the settlement of differences of professional opinion and for the investigation of complaints against dentists or societies.

The advantages of the scheme in its present form are almost entirely with the insured person, as far as it can be definitely stated that many of the workers would otherwise be unable to afford dental treatment, and there has been an undoubted improvement in the dental health of that class since the inception of the service.

The disadvantages rest mainly, but not entirely, with the profession; for the patient must and does suffer as a result of differences of professional opinion; there is no provision for regular inspection and treatment, and, as many societies are unable to provide the benefit, a large section of the insured population is ineligible. From the point of view of the profession, the standardization of fees has definitely tended to lower the fees of private practice, and to lead to the treatment's being carried out rather from the point of view of items than as a whole. The fact that societies provide the benefit out of surplus funds places the profession under the virtual control of laymen.

The need for some scheme which would at the same time satisfy the state, the public and the profession was for long apparent to the profession, and led to the British Dental Association's setting up a committee of experts to study the whole problem. The committee recently presented a draft report which has received the approval of the various dental organizations and the general support of certain of the bodies interested in health insurance matters. The recommendations represent a complete change from the methods described above, the fundamental difference being the provision of dental treatment as a statutory, instead of an additional, benefit. Such a change would at once entitle every insured person, rather than the fortunate few, to the benefit, and it would take control of the administration out of the hands of approved societies. The system of remuneration would be by a capitation fee, in return for which the dentist would provide annual inspection and treatment for each insured person on his list. The advantages of such a method are manifest, and there can be little doubt that the freedom from bureaucratic interference, the premium on good diagnosis and the incentive to build up sound dentitions would all react to the lasting benefit of the patient.

The application of a statutory scheme based on a capitation system is not without considerable practical difficulties, not the least of which concerns the annual fee which would secure to the dentist a fair and reasonable rate of remuneration for his work, and would, at the same time, be acceptable to the state. I am hopeful that the tentative fee put forward in the report referred to will prove acceptable to all parties. A difficulty which has a more immediate bearing on the application of the scheme is that of finance. The present contributions paid by employer and employe are only sufficient to meet the cost of statutory medical benefit, and additional funds would

be required to provide the dental benefit envisaged above. The present state of industry would not appear to be such as to permit of additional burdens being imposed on either employer or employed in the near future, and the need for state economy offers little hope of assistance from that source. Nevertheless, we consider that the ideal scheme is to hand and ready for application when finances permit.

CONCLUSION

If a moral is to be drawn from this survey of public dental service in Great Britain it is twofold: first, that it is the duty of the dental profession to assist in the provision of dental treatment for every class of the community, a duty which in Great Britain the profession has not been slow to realize; secondly, that the state, while rightly taking every care to supervise the treatment provided, must not be allowed to fetter the judgment of the professional man or to control the service, for as surely as the state controls, so does it destroy that intimate contact between patient and dentist which is vital to the practice of our healing art. If it is to retain its place in the family life of the people, the dental profession must retain its individuality and do all possible to maintain that fast vanishing type of practitioner, "the family dentist."

Although this paper appears under my name, the whole of the credit is due to Mr. W. G. Senior, dental secretary of the British Dental Association, who possesses a unique knowledge of the subject.

THE SOCIALIZATION OF DENTISTRY; ITS DANGERS AND ITS POSSIBILITIES*

By CHARLES F. L. NORD, D.D.S., The Hague, Holland

IF socialization of dentistry must be discussed in this country, first of all we must ask: Why just now? And, as far as I can judge, the answer must be that the economic situation has changed to such a degree that new means have to be sought to insure dental care for the majority of the people.

One used to be of the opinion that, in the United States, those who wished to work could work, and thus were able to pay for medical and dental treatment for themselves and for their families and that the poor had to be looked after by the state, community or philanthropic institutions. It is to be feared that these times have passed forever and that one has to face circumstances such as we have known for a long time in Europe.

From this point of view, we have to divide these people into two groups: 1. Workmen and all those who belong to this class, with their families. 2. The lower middle-class, having an income just sufficient to pay important extra expenses, such as dental bills of any importance.

If we, before making any suggestions to help these groups and to the benefit of all concerned, take into consideration

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 10, 1933.

how we have tried to solve this problem in Europe, in order to preserve what is good and to avoid the mistakes, we see that, for the first group, the workmen, the solution has been found in sick funds, under which originally only medical help was given and dental help consisted of the extraction of diseased teeth.

These funds are based on the insurance principle, which means that one has to pay only a small fixed sum weekly, for which treatment is given, the doctor thus being paid with the money of both those who are ill and those who are healthy. Thus, a reasonable fee is possible.

When, in the course of years, because of the propaganda for better oral hygiene and dissemination of knowledge regarding the possibilities of modern dentistry, it became necessary that these funds supply better dental care, the directors of the funds, reluctantly, met these requirements and began to appoint dentists instead of physicians to perform the dental work, which originally was only diagnosis and extraction, with the possibility of placing full dentures for an amount as small as possible, sometimes with the help of money of the funds.

Afterwards, aid was now and then extended for preventive dental care, under the condition that this be paid for through increased payments, on the one side, and eventually through additional small fees for the treatment (fillings) on the other side.

From what has been said, it is clear that a mistake has been made here, leading to much trouble in this particular field; for although medical help can very well be covered in an insurance system, as it is possible to calculate by means of statistics of diseases what the premium must be to provide reasonable help for the patients and at the same time guarantee the doctor a sufficient income. For dentistry, this is quite another thing, as there is no question as to what percentage of the insured will need help, nearly all being in that category.

That this system in dentistry did not fail immediately is due to the fact that through ignorance regarding the value of treatment and fear of pain, the number of people asking for help was so small as to give no indication of the percentage of those in need of help.

In this way, it was financially possible to extend treatment to include preventive care, and as it did not, for the reasons mentioned above, meet with failure, the faulty aspect of this system was not immediately noticed.

And so a vicious circle resulted: the greater the aid given, the greater the demand became, and the higher the financial costs.

What once was granted as a right could not be withdrawn, and so, in order to finance the dental treatment, the board of the various sick funds tried to reduce more and more the salary of the dentists, and the dentists tried to work faster to be able to get a reasonable income.

This had led to constant conflict between the dentists and the sick fund administrators, and this has not improved the quality of the work.

This is the situation regarding the first group.

As to the second category, the lower middle-class, this group of patients is convinced that it is impossible for them to afford dental care. They therefore as nearly as possible do without dental care, and if, on account of the pain, they can no longer put off seeing a dentist, they go to the advertiser, or other unqualified dentist, or to the clinic, and thus the ethical dentist is deprived of a large group of patients.

All this has led, in the various European countries, to a large number of dentists becoming functionaries in the state,

community or large societies, where they generally work in clinics. Their legal position, in most cases, is uncertain, their incomes are very low and the nature of the work means that pride in their daily work disappears, and thus the standing of the profession is lowered.

On the other hand, it cannot be denied that, through the propaganda for preventive dental treatment, the demand for dental care has penetrated to the masses of the people and, in this way, a much larger sphere of action for the dentist has been opened than was the case before.

The actual situation and its origin having been described, the question arises: How will it be possible to provide proper care for these groups, avoiding the mistakes which have been made in the past? First of all, another question has to be answered: Is it really necessary to look for a solution in this direction, or would it be wiser to let things take their course, leave the profession as it is?

It seems to me that for your country also the latter question must be answered in the negative. We cannot leave this very important matter to solve itself; in the first place, because the dental profession in every country has the moral duty to see that as large a part of the population as possible get dental care; and in the second and not less important place, because, if the profession does not rise to the occasion, others will take over this task.

Those others will be the state, the community or private persons. If the state interferes in this difficult problem, it will mean: officials, a bureaucracy, fees as low as possible and waste of money on a large scale, a situation which we know alas too well in all the countries where such a system exists.

If private persons (among whom I count the weaker confrères among the dentists) meddle with this question, they do so only to earn, in the easiest way, as much money as possible; which will not benefit either patient or dentist, the quality of the help given becoming only of minor interest.

For the reasons above stated, it is evident that the only way these problems may be solved is through the organized profession, and as quickly as possible!

If, in thinking about the possibilities, we begin to recognize as the first mistake of the past the attempt to bring dental care under an insurance system, it appears that the second mistake lies in the fact that it was not recognized as just as fallacious to believe that it is possible to treat the great mass of the people dentally as is done in private practice.

To my opinion, we will be able to find a solution only if we admit first of all that to treat the mouths of the masses in the way that we treat them in private practice is as impossible as unpayable!

Socialization of dentistry means rational help for all so that every citizen can have a proper chewing-apparatus, which is possible solely by prevention. Only if one admits this principle as an *axiom* is it possible to consider how to reach this goal, and, in that case, these methods will come to us in a logical way.

In private practice, we teach our patients that the children must, from early youth, be examined twice a year, and thus, they can, for the greater part, with little difficulty and slight cost, preserve their teeth.

The same method will have to be followed in treating the masses. That means: treatment of the young child, treatment of the children of school age and the further treatment of school children so that the teeth can be preserved with an expenditure of but little time and little money. If this is not done, school dentistry will be nothing more than a waste of money.

Preventive treatment cannot be brought

into an insurance system, but can be included in a system of subscription. It is possible to calculate the costs for further treatment of the child leaving school with sound teeth, and we know from experience that these costs are relatively small.

The sick funds and all those institutes where the working class has a right to medical help must also afford preventive dental care, on the condition that it is the duty of the patient to report twice a year to the dentist for examination. If he neglects to do so, his right to care gratis expires, and the help requested afterwards ought to be paid for in an amount to be fixed per operation.

In the second group, the lower middle-class, the same principle may be applied, only here the organized profession will have to take the lead locally. All well-known dentists will have to be invited to place their names on a list of those who for a fixed fee will examine and treat the mouths of the children twice a year after treatment at school.

There must be a rule that he who does not come in regularly will have to pay for dental care at a fixed price. In this way, it will be possible to assure for the future a people that will be dentally sound.

Now the question may be asked as to what is to be done with the adults. Here, again, the same axiom has to be remembered: It is impossible to pay for the repair of all neglected mouths if they are treated according to the principles of modern dentistry as applied in private practice.

Another plan will have to be made for this group, wherein treatment of root canals, crown and bridge work, etc., are excluded. The elements which cannot be saved should be extracted and replaced, when necessary, by plate work. When the mouth is put in a proper condition, for this group the first principle of service is the right to have an examination and treatment twice a year for a fixed subscription.

From a dental point of view, it will be recognized that it is unfair to do poor work in those mouths by filling certain front teeth, etc., which brings the profession into discredit and for the patients means a waste of money of which they can make much better use.

The "tooth carpenter" of the past must become as soon as possible the "doctor-dentist" of the future.

Of course, those who wish their teeth to be treated as in private practice can have this done, but a fixed fee is charged for each operation.

In the foregoing, it is considered that school dental care is a fact. It may be supposed that, in the near future, this will be true, as it has been sufficiently proved that this method of giving help can be so efficient and cheap that if only for economic reasons, the community cannot afford to do without it.

Where there is no school dental care, one will be compelled to care for the teeth of the children in another way, although this will be a more difficult problem.

SUMMARY

1. For the health of the people, it is necessary that care be taken of the teeth of the whole population.

2. The duty to cooperate with all concerned to further this end belongs in the first place to the organized dental profession, as they, first of all, are able to realize the opportunities and to impress others with its importance.

3. This is not only the duty of the profession, but also its advantage, as otherwise others will take over the task, and probably in a way benefiting neither the patient nor the profession.

4. Systematic treatment of the mouths of the people is only possible if based on

preventive dentistry; that is to say, the care of the teeth of the small child, with biannual examination and treatment where necessary.

5. Only in this way can treatment be afforded, and it will be necessary to look for the methods and means to realize this, according to circumstances and conditions.

I suppose that no one will have expected me to be able to announce one or more wonderful remedies assuring a quick and ideal solution of a problem that has for such a long time occupied the minds in many countries. I have not the slightest illusion of having told you something new or even of having pointed out new methods or a new system.

I have merely tried, having studied this problem during several years and having had the opportunity to visit many countries, and to speak with the leaders in those countries, to draw the attention to what I consider the mistakes and to what perhaps deserves to be considered in the future.

Thus, we shall try to bring order out of the chaos of opinions and arrive at constructive plans. First of all, it will be necessary to establish a scheme, of which eventually several points can be rejected as being unsound or can be amended, but which will give a basis for useful study and discussion. I have tried to submit to you such a scheme.

I have avoided tiring you with details. To those interested, I of course will gladly give those facts. It further is evident that important questions concerning the organization have not been brought up for discussion.

The use and the possibility of control of the various treatments, the way in which the patients have to be registered and administrated, the scale of the fees for the various groups with different incomes, the free choice of dentists and the use of dental hygienists are questions deserving ample consideration.

You will agree with me that where there is a will, there is a way, that it must be possible to find a solution for these problems and that it is no use to speak in detail as long as principles have not yet been accepted.

Many unnecessary difficulties have arisen in the past because too much attention was drawn to details, and thus what was most important and most necessary was lost sight of.

From the literature, I received the impression that here too much was said and written about all kinds of details instead of first considering the underlying principles.

I hope I have convinced you that in handling these problems, it is desirable to know something of the opinions of our colleagues in other countries, who have seen these problems from other points of view. In all these countries, the various methods and systems are different, and the moment you contemplate taking any measures yourselves, it would be wise to look for information to those who have lived under these systems and who will be able and willing to tell you of its advantages and its faults.

You no doubt know how well American dentistry is known and honored in Europe, and how American dentists are welcomed as guests. We are sorry that we see them so little, and I should like to urge you to participate more often in the international collaboration existing so efficiently in the International Dental Federation for more than thirty years, which has brought us so many firm international friendships, and which has had a great and favorable influence on the course of dental affairs in more than one country. I trust you too will participate in the future in this collaboration in the interest of all of us and for the welfare of our profession.

LEGISLATION AS A FACTOR IN PROFESSIONAL ADVANCEMENT*

By HOMER C. BROWN, D.D.S., F.A.C.D., Columbus, Ohio

GENERAL LEGISLATION

ADVANCEMENT in any phase of human endeavor registers its greatest triumph when the cause represented has progressed through all the necessary preliminary stages until finally its legal status is definitely determined by legislative action. True, all laws are subject to repeal or future amendments, but usually such amendments are for the purpose of perfecting and strengthening the laws in force. If such legislation is highly controversial, a repeal becomes the logical solution, if and when there is a definite reversal in public opinion; as, for instance, in the prohibition question.

The distinguished and talented Dr. Samuel Johnson is credited with making the following statement apropos this subject: "The law is the last result of human wisdom acting upon human experiences for the benefit of the public." This observation, made more than 150 years ago, is quite applicable today, as legislation can very properly be considered the statutory recording of progress, as measured by public opinion or stimulated by propaganda. Legislators are usually desirous of promoting the best interests of their constituents when informed of their desires, but, unfortunately, a large percentage of the electorate seldom take sufficient interest in public questions to communicate their views, if any, to their elected representatives. This can be definitely charged to personal indifference, while such public affairs should logically challenge the attention of all progressive citizens. In contradistinction, various selfishly interested groups recognize the necessity for developing and vigorously promoting their legislative agenda, and a lukewarm public generally permit these groups to assume, unrestrained, the active leadership in such problems.

One specific instance, in which a well-organized industry was able to secure a transfer of an item of excise tax from the producer to the consumer, is the best evidence of what really can and sometimes does happen in legislative halls. During the Seventy-Second Congress, the Senate amended the 1932 Revenue Act, which had previously passed the House, by providing for a tax on electrical energy, to be assessed against the producer. This Amended Bill was sent to a conference committee in order to adjust this and other differences and, regardless of their prescribed limitations, the agreed-on report transferred this tax to the consumer. Legislative and parliamentary procedure would have seemingly precluded such action, and the fight made by the late Senator Howell of Nebraska, on behalf of the public as against the public utilities, will long be remembered by many.

Any one familiar with the usual limitations of conference committees will

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contend that such a transfer was not germane and, therefore, it could not be made; but in this I am reminded of the story of a man who had been placed in jail for some alleged violation of law and was holding a conference with his attorney. After being fully advised of the facts in the case, the attorney gravely announced: "That is no serious offense and you cannot be put in jail on such a trivial charge!" Whereupon the prisoner replied: "Hell, don't tell me that, ain't I here?" Through a somewhat similar procedure, this transferred excise tax was a provision of the Revenue Act, as finally passed, and has been collected from every consumer of electricity since June 21, 1932. But, be it said to the credit of the recent Special Session of Congress, this section of the Act was so amended that the 3 per cent tax will be assessed and collected from the producers on and after September 1. In view of this fact, and other similar instances, together with the ever-increasing tendency of most special interests to be represented in legislative matters, it would seem quite appropriate for Congress and state legislatures to make provision for the assigning of competent persons to represent the unorganized public officially in all legislation, in an effort to protect their interests. Such persons should be compensated through appropriations from their general funds; which would seemingly be well justified.

Legislators are frequently disposed to promote their individual and party interests before giving serious consideration to public affairs. It is fortunate that we find some outstanding members who, as statesmen, are well-informed in the intricacies of governmental science. Such persons are distinguished for their ability as leaders in thought and action. They profit by past experiences and take advantage of all favorable opportunities for progress, employing diplomacy and aggressive leadership in an effort to educate their colleagues in matters of public concern. They also recognize that there are too many laws and too much laxity in their enforcement. The authority to enforce laws and regulations implies, with equal concern, a duty on the part of all good citizens to support constitutional government.

In this connection, it may be interesting to report that 20,501 bills were introduced in the Seventy-Second Congress, the 1932 Session. Fortunately, only 767 of these were enacted, of which 441 were of public concern and 326 distinctly private. In addition to this, there were 1,766 resolutions introduced, of which seventy-five were adopted, seventy-four of these being of public interest and one private. During the Special Session of the Seventy-Third Congress, recently adjourned, there were 8,680 bills introduced, but only ninety-four were enacted, of which twelve were of a private nature. Also, 595 resolutions were introduced, but only eleven of public significance were approved. Most of the legislation enacted, during the Special Session, was for the purpose of granting adequate authority to the President to formulate and enforce a program for the restoration and stabilization of our shattered social and economic system. In such a program, initiative and leadership are the two most valuable assets, and when they are combined with the determination to go forward, satisfactory progress should be the end result.

Comparable with the foregoing Federal legislative data, there were 1,125 bills introduced in the General Assembly of Ohio during its recent six-months session, but only 209 of these become laws. These reports clearly indicate that only a very small percentage of the proposals introduced in Congress or the

state legislatures are enacted into law; which is indeed most encouraging.

INFLUENCE OF DENTAL LEGISLATION

To discuss legislation more directly as a factor in professional advancement, it will be readily admitted by many that legislation has been an outstanding factor, if not the most positive and constructive one, in the advancement of the practice of dentistry to its present-day favorable status. Thus, the meeting of the three affiliated dental organizations at the time of and in connection with the Century of Progress Exposition is indeed relevant, since dentistry's signal progress as a separate health profession had its inception nearly 100 years ago. Therefore, a review of the influence of legislation as relates to professional advancement would seem quite appropriate in providing a necessary historical background for presenting this subject in a chronologic and constructive manner.

As far as I am informed, the first specific dental legislation was enacted by the General Assembly of Maryland, Feb. 1, 1840. If not the first, it was of signal importance, as it authorized the establishing of the first dental college in the world; which automatically created a legal and professional status for dentistry. Shortly prior to the enactment of this legislation, there were a few leading dental surgeons actively interested in improving general dental conditions. Some of these endeavored to provide a course in dentistry in the School of Medicine, University of Maryland, but failed. At that time, medicine was just emerging from its swaddling clothes, after passing through an unusually long siege of internal dissension, and, "reading between the lines," it would seem that these professional jealousies and enmities were responsible for the failure of this project. Therefore, Horace H. Hayden and Chapin A. Harris, the leaders in this dental college movement, soon turned this failure into success when they, together with two physicians, Henry Willis Baxley and Thomas E. Bond, Jr., presented their cause to the General Assembly of Maryland; which resulted in the enactment of legislation providing for the chartering of the Baltimore College of Dental Surgery. These legislators evidently recognized the justness of the cause, since there was no precedent to follow. J. Ben Robinson, the present dean, kindly furnished a copy of this act, which is incorporated as a historical record:

LAWS OF MARYLAND, ACT OF 1839, CHAPTER 155

An Act Incorporating The Baltimore College of Dental Surgery

Section 1. Be it enacted by the General Assembly of Maryland, That a College of Dentistry be, and the same is hereby established in the city of Baltimore, to be known and designated by the name and style of the Baltimore College of Dental Surgery.

Sec. 2. And be it enacted, That the following persons be and are hereby appointed and constituted the Professors of said College, to wit: Horace H. Hayden, M.D., to be Professor of Dental Pathology and Physiology; Chapin A. Harris, M.D., to be Professor of Practical Dentistry; Thomas E. Bond, junior, M.D., to be Professor of Special Dental Pathology and Therapeutics; and H. Willis Baxley, M.D., to be Professor of Special Dental Anatomy and Physiology.

Sec. 3. And be it enacted, That the said Professors and their successors, shall be, and are hereby declared to be a corporation and body politic, to be perpetuated, under the name of the Baltimore College of Dental Surgery.

Sec. 4. And be it enacted, That the said Professors and their successors, shall be capable, in law, of purchasing, receiving

by gift, or otherwise, and holding, improving and disposing of property, real, personal or mixed; and they may take and receive any sum or sums of money, or any kind of goods and chattels that may be sold or given to them by any person or persons, bodies politic or corporate, and employ the same for the benefit of said College; they may sue and be sued, plead and be impleaded, answer and defend, and be answered and defended in all courts of law and equity; and they may receive and make all deeds, transfers, covenants, conveyances, grants, contracts, agreements and bargains whatsoever necessary for the purposes of the corporation; they may have and use a common, corporate seal, which they shall have power to renew or alter at pleasure and generally may do every other act or thing necessary to carry into effect the provisions of this act, and promote the interests and designs of the corporation; provided however, that their corporate stock or property acquired, shall never at any time exceed the sum of twenty-five thousand dollars.

Sec. 5. And be it enacted, That the Professors or a majority of them, shall have power to elect a President and such other officers as may be necessary; and they shall have power to fill vacancies that may occur in their body, and choose and appoint Lecturers in the different branches of Dental Science.

Sec. 6. And be it enacted, That the said Professors and their successors shall have authority to make ordinances for their own government, and for the government of the institution over which they are placed; and they shall meet once or oftener in every year, at such stated times as they may appoint, to devise the ways and means for properly conducting the same; a majority of the whole number of Professors shall be a quorum for the transaction of any business, except the vacating the chair of a Professor, which shall require the consent of three-fourths of all the Professors.

Sec. 7. And be it enacted, That the said Professors and their successors shall hold at least one term in every year, for the period of four months, for the purpose of delivering lectures and instructions in the different branches of Dental Science, for which they are hereby empowered to charge such fees as they may deem proper for attending such lectures and receiving such instructions.

Sec. 8. And be it enacted, That R. S. Stewart, M. D., Joshua T. Cohen, M. D., Thomas E. Bond, junior, M. D., Thomas C. Risteau, M.D., Reverend John G. Morris, Reverend Beverly Waugh, John H. Briscoe, M.D., Samuel Chew, M.D., Reverend George C. M. Roberts, M.D., John James Graves, M.D., Reverend Doctor J. P. K. Henshaw, Reverend James G. Hammer, John Fonerden, M.D., Leonard Mackall, M.C., and Enoch Noyes, be appointed to a Board of Visitors, to be styled the Board of Visitors of the Baltimore College of Dental Surgery; who shall be empowered to examine into the state and condition of the institution, and see that the requirements of this charter are fulfilled; five constituting a quorum; they shall meet at least once in each year to fill vacancies that may occur in their body, appoint such officers as may be necessary to the discharge of their own duties, and attend to any other business connected with their office as visitors and supervisors of the institution.

Sec. 9. And be it enacted, That the said Professors shall have full power to confer on any student who shall have attended all the lectures in said college for two terms, and others, who, after an examination by the Professors, shall have been found worthy, the degree of Doctor of Dental Surgery; and the said Professors shall have the power, and are hereby directed to accept evidence from any student of his having attended lectures in any respectable Dental or Medical School for an equal period of time, and receive the same as equivalent to his having attended one of the terms herein mentioned.

Sec. 10. And be it enacted, That the Professors shall have the power to confer the honorary degree of Doctor of Dental Surgery on any Dentist who may have ren-

dered service to the science, or distinguished himself in his profession.

Sec. 11. And be it enacted, That this charter and act of incorporation, and every part thereof, shall be valid in law according to its true intent and meaning, and shall in all cases be so construed as to answer the ends of the corporation in the advancement and promotion only of Dental Science; provided however, that nothing herein contained shall be so construed as to authorize or empower said corporation to issue any note, certificate, token or evidence of debt, to be used as currency.

Sec. 12. And be it enacted, That the General Assembly of Maryland reserves to itself the right to alter or annul this act of incorporation.

Sec. 13. And be it enacted, That this act shall continue and be in force for the period of thirty years, and no longer, from the passage thereof." (Passed February 1, 1840)

A reprint of an article by Dr. Robinson accompanied the foregoing act, in which appeared a facsimile of the license issued to Horace H. Hayden by the Medical and Chirurgical Faculty of Maryland about 1810. This, the first license issued for the practice of dentistry in the United States, was authorized by an interpretation of the charter of the institution, which, together with the fact that Dr. Hayden was the president of the first dental college and of the first dental society, emphasizes his influence on our early dental history. In this connection, it is interesting to note that among the pictures of prominent women dentists and physicians in the Hostess Booth of the Medical, Dental and Allied Science Women's Association of the Century of Progess is one of the late Gillette Hayden, of Columbus, Ohio, who was a great granddaughter of this pioneer dentist. She, like her illustrious forebear, was recognized as a leader in her specialty of periodontia and enjoyed an international reputation.

The next important dental legislation was enacted by the General Assembly of Ohio, Jan. 21, 1845. This act authorized the establishing of the Ohio College of Dental Surgery at Cincinnati, the second dental college to be chartered. This legislation is also incorporated for the same reason and under the same restriction as the Maryland Act:

AN ACT

To Authorize The Establishment of a College of Dental Surgery

Sec. 1. Be it enacted by the General Assembly of the State of Ohio, That B. P. Aydotte, Robert Buchanan, Dr. Israel M. Dodge, William Johnson, J. P. Cornell, and Calvin Fletcher, of Cincinnati, Dr. G. S. P. Hempstead, of Portsmouth, and Dr. Samuel Martin, of Xenia, and their successors, are hereby constituted and appointed a Board of Trustees, with power to establish a College of Dental Surgery, in the City of Cincinnati, and said Board is hereby declared to be a body corporate and politic, with perpetual succession, and shall be known by the name and style of the Trustees at the Ohio College of Dental Surgery; and the said Board shall have power to acquire, hold and convey property for the endowment of said college, to sue and be sued, contract and be contracted with, plead and be impleaded, defend and be defended, answer and be answered unto, in all courts and places, and in all matters and causes whatsoever; provided that no part of the estate, either real or personal, which said corporation may at any time acquire, shall be employed in the business of banking, or for any other purpose than that designated by this act; and provided also, that the revenues arising from the property which said incorporation shall be permitted to hold, for the purposes above specified, shall not exceed the sum of five thousand dollars per annum.

Sec. 2. That the said incorporation may have a common seal, which may be altered, broken or renewed, at pleasure.

Sec. 3. That the officers of said incor-

poration shall be a President, Vice President, Registrar and Treasurer, who shall be elected annually, by said Board of Trustees, at such time and in such manner as the said Board may direct, and shall hold their offices until their successors are chosen.

Sec. 4. That the Trustees of the aforesaid incorporation shall have full power to create and establish such professorships as they may deem necessary for said college, and that they may, at any time, appoint or dismiss all such professors or lecturers as they may think proper; also to make and ordain such by-laws, rules and regulations as they may deem necessary for the government and well-being of said college; provided such by-laws, rules and regulations are not inconsistent with the constitution and laws of this State and of the United States; and provided also that no branches of medical science shall be taught except those necessary to dental surgery.

Sec. 5. That all vacancies which may occur from death, resignation or otherwise, in the Board of Trustees of the aforesaid incorporation, shall be filled by the remaining members of said Board.

Sec. 6. That the said Board of Trustees shall have power and are hereby authorized to confer the degree of Dr. of Dental Surgery, and grant diplomas for the same, under the seal of the incorporation; provided that no diploma thus granted shall confer any privilege further than the practice of dental surgery.

Sec. 7. That the said corporation shall be subject to all the regulations and liabilities of an act instituting proceedings against corporations not possessing banking powers, and to provide for the regulation of corporations generally, passed March 7th, one thousand eight hundred and forty-two.

Sec. 8. This act shall take effect from and after its passage.

John M. Gallagher,
Speaker of the House of Representatives.

David Chambers,
Speaker of the Senate.

January 21, 1845.

This Ohio legislation was published in the seventh volume of the *Dental Register of the West,* 1853 and 1854. In the same issue is found some very interesting information. For instance, at the meeting of the American Society of Dental Surgeons, held at West Point, N. Y., in 1853, they, like many dental societies of today, were engaged in revising their Constitution and By-Laws. An interesting item contained in this journal was as follows:

Art. 13. Any dentist who shall procure a patent for a remedy or instrument of dental surgery, or who deals in patent remedies or nostrums, shall be disqualified for membership.

This proved to be a debatable question and the closing comment was:

Most of the members gave their views, after which the article was adopted almost unanimously, as read.

The advertising phase of practice was also a problem, as the following Resolution would indicate:

Resolved, That any member of this Society who shall extol his own peculiar merits over a fellow-practitioner in the public prints, or employs means of advertisement which may be regarded by this Society as lowering its dignity or compromising its character, shall be impeached, suspended or expelled.

The Maryland and Ohio legislation provided the legal authority for developing programs of dental education and conferring the degree of doctor of dental surgery; which definitely and permanently registered the status of dentistry as a separate health profession. Since then, some have contended that the separation of dentistry from medicine was a decided mistake, and others have advocated a similar educational curriculum for the practice of medicine and dentistry. A committee on medical education recently made a voluminous report which contained such a recommendation,

but after nearly a century of unparalleled progress of dentistry as a separate and distinct profession, it would hardly seem probable, even in these days of great disturbance and surprising changes, that this would be soon adopted. The absence of logical supporting arguments for such a change should challenge the alleged assumption that, if adopted, it would increase the efficiency of dental service.

Dentistry was given a distinct stimulus by the organization of the American Society of Dental Surgeons in 1839 and the publication of the first dental journal, the *American Journal of Dental Science,* soon thereafter, with Chapin A. Harris as editor. The Mississippi Valley Association of Dental Surgeons was organized in 1844 and functioned efficiently for more than fifty years. I attended one of their meetings during my senior year in college. This Association sponsored the publication of the second dental journal, the *Dental Register of the West,* which began publication in October, 1847, with James Taylor as editor. Other outstanding dental achievements, during this period, were the discoveries of the anesthetic properties of nitrous oxide gas, by Horace Wells, in 1844, and the anesthetic properties of sulphuric ether, by William T. G. Morton, in 1846. Both Wells and Morton were dentists and, in my estimation, their discoveries are the two greatest humanitarian contributions ever made for the relief of human suffering. Can any one imagine the people of this or any other civilized country living today without having these and other anesthetics as an aid in the alleviation of human suffering and the correction of physical defects? These discoveries later became involved in legislation; and as soon as our economic ills are restored to normalcy, it is hoped that Congress will officially memorialize the world-recognized humanitarian contributions of these two pioneer surgeon dentists. As an indication of the importance of these discoveries, we incorporate a press item from Chicago under date of June 24, quoting George W. Crile, the distinguished Cleveland surgeon:

"Looking forward we can glimpse a century of fewer operations," he said. "Biochemistry and biophysics will supplant the scalpel, and present day medical theories will give way to mathematical equations."

As for the success of present surgery, the Cleveland surgeon, who won a world-wide reputation for himself in France during the World War, said he laid it to four developments during the past one hundred years.

"I refer," Dr. Crile said, "to the discovery and development of anaesthesia, to the discovery and development of methods of antiseptics and asepsis, to the prevention and treatment of surgical shock, and to the treatment of hemorrhage and shock by blood transfusion."

STATE DENTAL LAWS

Alabama was the first state to enact legislation to regulate the practice of dentistry, Dec. 31, 1841. This provided that, on and after the first Monday of December, 1842, the state medical boards should examine and license persons to practice dentistry. It further provided that, where practical, dentists should be elected to serve on these examining boards. Kentucky enacted a dental law, Feb. 6, 1867; New York, April 7, 1868, and Ohio, May 8, 1868. Subsequently, other states passed similar laws until the status of dentistry today is on a higher plane than at any previous time. In support of this, a number of states enacted improved dental legislation during the past year. Especially is this true as relates to clarifying what constitutes the practice of dentistry and providing increased authority for better regulating the ethical conduct of the practitioners.

These laws when first enacted were not very exacting, but now only graduates from reputable dental schools are accepted as applicants for examination. Further, the present dental laws of most of the states have been so amended that the health and welfare of the public are better conserved and the interests of the profession, in most instances, well safeguarded. The increased recognition of dentistry, as an integral phase of health service, has contributed greatly to the present high plane of our state dental laws; but, in this, organized dentistry, dental education, dental research and dental journals have been most helpful in furthering such legislation. Conversely, the enactment of these state laws have stimulated dental education to its present high standard. Thus, the influence of legislation on dental education and the general advancement of the profession has been most constructive.

In discussing medical and dental problems, William Gerry Morgan, who at the time was president of the American Medical Association, stated that the dental profession has advanced a generation during the past fifteen years. This was indeed a strong endorsement from an authority.

COURT DECISIONS

In this connection, it is also interesting to note that more favorable court decisions have been rendered during the past year than in any previous decade. Many of these place stress on the fact that the practice of dentistry is primarily a health service and that these dental laws have been enacted principally for the protection of the health and the welfare of the public; also, that the dental boards are functioning for a like purpose. A number of these decisions hold that the practice of dentistry is a personal service and can be rendered only by the individual to whom a license has been issued, rather than in the name of a company or a corporation. In support of this, it is encouraging to report that in several states, their laws, in this particular, have been amended accordingly. In addition to this, legislation has been enacted in several states, requiring the appointment of a dentist on their state boards of health. In North Carolina, it is provided that a dentist, if available, must be appointed on every county board of health.

FEDERAL LEGISLATION

Army Dental Corps.—The first dental legislation enacted by Congress, Feb. 2, 1901, provided for a probationary dental corps of thirty members, employed as contract dental surgeons. This was amended, March 3, 1911, authorizing a commission rank of first lieutenant for members of this corps, under stipulated conditions. The National Defense Act, June 3, 1916, provided increased rank up to and including major, and the legislation of Oct. 6, 1917, granted the dental officers equal status with the officers of the Medical Corps. This was the greatest legislative accomplishment in the history of the profession, as it definitely raised the status of dentistry in governmental service and increased its recognition by allied professions and the public. This and other epoch-making periods in our progress are of distinct historical value, and since claims and counterclaims are frequently made regarding how and by what influence this and other legislation and regulations were successfully promoted, the suggestion is prompted that it would be seemingly appropriate for the Committee on History of the American Dental Association, or some other officially appointed committee, to be authorized to review impartially all valuable data relating to such controversial questions and present their findings. This

would be much better than to attempt, many years later, to compile a historical résumé after much of the now available information is inaccessible. Such a procedure would prevent the now prevailing situation wherein some writers who are preparing certain dental historical data are confronted with the fact that some of the essential documentary evidence has been lost or destroyed.

At the present time, there are 158 permanent and fifteen temporary dental officers in the Army. Previous to the authorization of the Army Dental Corps, various organizations and individuals had advocated that dental service be provided for the personnel of the Army and Navy, and I made such a recommendation, under most favorable conditions, to Surgeon General Sternberg during the Spanish American War in 1898.

Navy Dental Corps.—Congress enacted legislation, Aug. 22, 1912, authorizing the establishing of a Naval dental corps, with the original appointments to be made in the rank of lieutenant, junior grade. Through subsequent amendments, this corps now occupies a status similar to that of the medical officers of the Navy, and consists of 186 permanent and six temporary officers.

United States Bureau of Public Health.—Prior to 1919, there were no dental officers in the United States Public Health Service, although this was the oldest governmental medical corps. At that time, dental officers were admitted to the corps and given reserve commissions in the various grades. They served in this status until April 9, 1930, when Congress enacted legislation authorizing their transfer to the regular corps of the Public Health Service, according to the grades held at that time, with full credit for previous service. These officers are now commissioned with the same rank, pay and promotion as provided for the Army and Navy. At present, there are forty-two commissioned officers and seventeen dental interns, the latter being appointed for periods of one year. If their services as interns are satisfactory, they are given the privilege of taking the examination for admittance to the Regular Corps.

National Institute of Health.—Dental officers of the United States Public Health Service have been assigned to dental research duty at the National Institute of Health. Also, ten dentists have been appointed as research consultants in the United States Public Health Service.

Indian Bureau.—In addition to the foregoing, there are ten full-time dentists, under Civil Service, assigned to the Indian Bureau, and ten part-time, some of whom are rendering service on a fee basis. The dental service of this bureau is connected with the Health Division of the Office of Indian Affairs and supervised by medical and dental officers of the United States Public Health Service.

United States Veterans Bureau.—June 7, 1924, Congress enacted legislation providing dental service for the Veterans Bureau. This gradually expanded until the passage of economic legislation, March 20, 1933, when there were 177 full-time and seven part-time dental officers in this service. This number has been reduced to 161, as of July 19. In addition, there are 3,079 dentists in private practice whose services are utilized, as occasion requires, in rendering treatment to administration beneficiaries.

OTHER FEDERAL LEGISLATIVE ACTIVITIES

Supplementing the foregoing, the following problems have received legislative attention:

1. Two bills relating to an excise tax of $10.00 per ounce on new-mined gold, at the 1920-1921 sessions of Congress.
2. Tariff acts of 1922 and 1930.

3. Tax on alcohol.
4. Narcotic license fee and regulations.
5. Appropriation for cooperative research at Bureau of Standards.
6. Coordination of all governmental health services in United States Public Health Service.
7. National Institute of Health.
8. Excise tax on dental proprietary products.
9. Two international dental congresses.
10. Boiler inspection, including dental air compressors, vulcanizers, etc.
11. Modification of bankruptcy laws.
12. Nonservice connected pension legislation.
13. Uniform narcotic legislation.
14. Taber amendment.
15. Puerto Rico legislation.
16. Reduction in postage.
17. Other legislative items wherein dentistry was involved.

The state society officials have also been assisted in preparing and promoting legislative programs.

CORRELATED FEDERAL PROBLEMS

Correlated federal problems concern:

1. Deducting expenses in attending professional meetings from income tax reports.
2. Making contacts with the Department of Commerce and Bureau of Standards in establishing cooperative dental research at the Bureau.
3. White House Conference.
4. Modification of prohibition regulations.
5. Excise tax on precious metals used in dentistry, 1932 Revenue Act.
6. Reestablishing former status of Navy Dental Corps.
7. Assignment of dental officers to Citizens Conservation Corps.
8. American dental degrees in England.
9. Uniform narcotic legislation.
10. Dental health survey.
11. Restoration of "dental service" versus "stomatologic service," in the Navy.
12. Embargo on gold.
13. Modification of regulations requiring affidavits in purchase of gold.

ECONOMIC FACTORS

Every activity has recently been confronted with a serious situation, not a mere imaginary theory. This has been in the form of a concrete manifestation of the irresistible processes of unrest and suggested changes, resulting from the present social, economic and industrial crisis.

Consequently, the dental profession will no doubt find it necessary to make some readjustments in order to coordinate its activities effectively with the conditional developments. The forced neglect of dental treatment, during this economic period, would seemingly tend to stimulate an increased demand for dental service, if and when normal conditions are restored. This neglect will unquestionably produce an increase in systemic disease, through dental foci of infection, and various manifestations of undernourishment will leave its tragic effect on the youth of our country. These assumed conditions, supplemented by the agitation connected with the survey by the Committee on the Costs of Medical Care and its final report, may encourage certain commercial interests, welfare organizations or socialistic groups to initiate legislation which will result in some form of insurance, state or panel dentistry. In view of all of this, as well as the humanitarian phase of the problem, which transcends all other interests, organized dentistry should recognize the situation and assume the initiative in formulating a conservative and yet progressive dental

health program. This should contemplate, as one of its chief objectives, dental treatment to a greatly increased number whose incomes have not heretofore permitted the obtaining of more than emergency relief.

Unless some practical readjustments are formulated and promoted by organized dentistry, some of the other interests heretofore mentioned will, in my opinion, assume the initiative in promoting a type of service that will probably prove a decided handicap to the dental profession and lower the standard of service to the public. Also, the overhead expense associated with such proposed plans will be an item of total loss as far as real dental care is concerned, which may be estimated as high as 40 per cent. In the event some such program is developed and promoted, it would seem only reasonable to assume that more dentists will be required to render this additional service, and likewise that there will be an increased demand for dental supplies and equipment, but the public will be the recipient of the greatest benefits.

The preceding paper, "The Socialization of Dentistry, Its Dangers and Its Possibilities," by the secretary of the Internationale Fédération Dentaire, Charles F. L. Nord, should present illuminating data on a subject which is receiving much attention at this time. It is hoped that this presentation, together with the first paper of the Session by A. E. Rowlett, on "Public Dental Service in Relation to the Public and the Profession," will greatly assist our profession in formulating a constructive policy relating to this question. These gentlemen will present the views of their respective professional organizations; but it should be recognized that conditions in many of the foreign countries are quite different from those existing in the United States.

It is also quite important that dental, like medical, treatment be considered as a necessity and exempted with food and other actual necessities from both Federal and state sales tax legislation, when such legislation is proposed to raise the necessary revenue to balance budgets and for the functioning of necessary governmental activities. A healthy, contented and prosperous citizenship is a country's greatest asset, and it is both destructive and illogical to penalize individual and professional efforts in the promotion of health, by any such taxation methods.

Furthermore, it would seem appropriate to develop and aggressively foster a program of uniform dental education and legislation. Legalizing of limited or special practitioners should be opposed. The recommendation of the Committee on Medical Education relative to dentistry's becoming an integral part of medical education should be disapproved. Any effort to restrict the present-day recognized field of dental practice, including that of the dental specialist, should be resisted.

While the advancement of our profession during the past century has been quite remarkable, it is self-evident that there never was a time when it was more important to be constantly alert in conserving the interests of the public and the profession. In doing this, it would seem imperative that a greatly increased percentage of the ethical practitioners become affiliated with our dental organizations. This will stimulate them to keep step with professional advancement and thereby render a better service, as well as assume and discharge their responsibilities, to a certain degree at least, in organized dentistry's efforts to promote legislation and regulations for the best interests of all concerned; opposing destructive movements which, in a brief period of time, might impair our favorable status, which it has required years

to achieve and would necessarily require much effort and a long time to regain. Manifestly, the profession should be concerned in developing and promoting plans to preserve its favorable status and extend an efficient service as a health measure.

The recent developments in connection with the economic crisis have stimulated interest in our legislative activities, and the need for protecting the profession and the public, through legislation and departmental regulations, is more urgent than ever before. The promotion of legislation is a complicated problem and the best results can be secured only through organized effort, plus vision, initiative and efficient leadership. Legislation is not obtained by the mere asking, but only after persistent effort and "team work," and then, quite frequently, it becomes necessary to compromise on some of the advocated provisions before final action can be secured. This should not be too discouraging as the most satisfactory legislation is usually secured through progressive stages.

Roy A. Green, in discussing legislation in his president's address before the California State Dental Association, said:

Legislation has more direct influence upon dental practice than any other factor. We are in the midst of a legislative year with some forty bills in the legislature affecting dentistry, and a resolution requiring the introduction of a bill in the Senate within two years providing insurance and state medicine. The dental technicians are striving for licensure; unethical groups are seeking to allow unlicensed persons to practice under their supervision, . . . while others wish to repeal the present dental law and allow reciprocity and corporate practice. . . . Within the next four years the practice of dentistry will undergo a very distinct change. A committee has been appointed to be on the alert and in a position to analyze and present these differences to you. I predict some form of insurance and possibly state medicine within the next two years, with the inevitable incorporation of dentistry. Even now, various plans of practice are being tried. The result is unknown but a change is certain. Build up your membership, abide by the decisions of this Association, live up to your code of ethics and you cannot go far wrong.

O. W. Brandhorst, editor of *Missouri Dental Journal,* in an article, "Why Organized Dentistry?" appearing in the May-June 1933 Journal of the California State Dental Association, under the subheading "Security," states:

In spite of all our enthusiasm for services, our rewards, our fellowships and our education, without security for ourselves, our loved ones and our patients, life would still be hazardous. But again, the foresight of our leaders and the willingness of men have contributed their mite to make an effective organization, and have driven away our fears, to-wit:

(1) Organized dentistry promotes legislation to set up and protect our educational standards.

(2) Organized dentistry promotes legislation to protect our professional standards.

(3) Organized dentistry promotes legislation to protect our ethical standards.

(4) Organized dentistry promotes legislation to protect us against unjust lawsuits.

(5) Organized dentistry promotes legislation to protect the public whom we serve.

(6) Organized dentistry promotes legislation to establish a just recognition of dentistry in health work.

(7) Organized dentistry guards us against unjust legislation and taxes.

(8) Organized dentistry guards us against special taxes.

(9) Organized dentistry presents pertinent facts to congressional committees.

Obviously, these arguments apply with equal force to the other activities of organized dentistry, through which every practitioner has benefited, and it is regrettable that so little interest or appreciation has been shown in recent years, when conditions have been more favor-

able, for the sacrifices of our dental pioneers, who progressed through organized effort in spite of serious handicaps, or through organized effort. All of this has contributed largely to whatever success they have obtained, as well as the benefits accruing to their clientele. Thus, a concerted effort to stimulate all eligible nonmembers to become actively affiliated with organized dentistry will be doing them a distinct favor. To this end, adequate publication facilities should be provided for the dissemination of organizational information of practical value, as a stimulus for increasing and maintaining the membership of our dental societies. In support of this policy, the following professional code, credited to Gen. Charles G. Dawes, a former vice-president, would seem appropriate:

> If you work in a profession, in heaven's name work for it. If you live by a profession, live for it. Help advance your coworker. Respect the great power that protects you, that surrounds you with the advantages of organization, and that makes it possible for you to achieve results. Speak well for it. Stand for it. Stand for its professional supremacy. If you must obstruct or decry those who strive to help, why—quit the profession. But as long as you are a part of a profession, do not belittle it. If you do, you are loosening the tendrils that hold you to it, and with the first high wind that comes along, you will be uprooted and blown away and probably you will never know why.

Criticism is to be expected in most of life's endeavors and it frequently serves as a stimulation. When this is presented for constructive purposes, it is to be highly commended, but when it is offered solely as a negative procedure, without any substitute of alleged value, it should be wholly disregarded. Under existing conditions, there is no place for internal dissension, but rather it behooves the profession to be keenly alert that we may retain the progress achieved and be prepared for any unexpected emergencies. An appropriate slogan to meet the present membership situation would be: "Every eligible dentist will be welcomed into organized dentistry and classified as an asset, while every nonmember should be considered as a potential professional and political liability." Therefore, it becomes the obligation of every actively interested member of organized dentistry to consider himself a committee of one to see that every eligible nonmember has this question so presented that he can fully evaluate the importance of dental society affiliation, as it applies to his practice.

In this connection, it should be recognized that all of the essential colors, and other necessary facilities, are available to enable such a member to paint a sufficiently appealing picture that the nonmember can fully visualize it, thus encouraging him to recognize that his present position, as well as his future, is largely the result of the combined efforts of himself and others, with considerable emphasis on the latter group. This may require some sacrifice on the part of both the member and the nonmember, but each will fall short of his obligation if he does not cooperate in this meritorious project, which may be considered as a challenge for a closer coordination of individual and organizational enlistment for service under what can very appropriately be termed as the "Reconstruction Act" of the dental profession.

609 Hartman Building.

HOLLOW GOLD INLAYS

By A. M. GOLDENBERG, D.M.D., Cambridge, Mass.

THERE has long been a need in dentistry for hollow gold inlays, the body or center of which is built entirely of the cementing medium as shown in Figure 1.

The advantages of this type of inlay are as follows: 1. There is less thermal shock to the pulp, owing to the nonconductivity of the large bulk of cement. 2. Large inlays that are very light in weight cause less trauma to the individual tooth. 3. Inlays that have more undercut have less chance of becoming uncemented. 4. The great saving in the amount of gold used makes the inlay less expensive and allows the dentist to use a better grade of gold at less cost. 5. The building of inlays with open facings in them (to be taken up later) is possible. 6. There is less contact of the gold with the dentin of the tooth structure, and thereby less chance of a misfit.

TECHNIC

This technic needs no equipment in addition to that used regularly for casting gold inlays.

A regular inlay preparation of the cavity is made and an accurate impression of the tooth is taken with modelling compound in a stiff band or tray. Two wax impressions are made, one of the abuting teeth and one of the opposing teeth, and an accurate thin wax bite is taken. An amalgam die is packed and inserted in the wax impression, and plaster casts are run and set up on an articulator. The amalgam die is withdrawn from the model and the die is oiled with a very thin lubricant. The excessive oil is blown off and removed as thoroughly as possible.

Any standard casting inlay wax that does not pull away from the margins when chilled is used for the casting. A thin sharp wax instrument is heated and several small runners of wax are applied along the floor of the cavity and extended to the margins of the cavity, as shown in Figure 2.

Next, a bead of wax is run around the margins of the cavity.

A small quantity of any good standard inlay investment is mixed until it is very thick and then vibrated into the die on top of the wax skeleton. The investment material is built up until it covers the margins of the cavity and is slightly larger than the desired gold inlay. This is allowed to set for from twenty to forty minutes, or until the investment is hard. With a sharp wax carver, the investment is roughly carved until a good portion of the marginal wax beading shows.

The amalgam die is placed back in the laboratory model, and enough investment is carved away to allow for a thickness of wax in the finished carving of about 24 gage. With a round No. 2 bur a hole is made in the investment at the point where we later desire to have the sprue attached, and preferably on the occlusal surface. This sprue hole should not quite touch the floor of the cavity and should be slightly widened at its base so that the wax post shall engage the investment material. Now the die is re-

moved, the operator making sure that a clean wax margin is exposed all around the cavity. Then warm wax is made to flow over the entire surface of investment and wax beading and is chilled and carved, the die being replaced in the model to get the proper contour. Through the thin carving can be seen the end of the wax post, and a phonograph needle should be warmed and inserted deep in the wax at this point. The wax is allowed to cool, then grasping the sprue firmly, the operator withdraws the entire mass. Now, the outer surface of the entire wax mass has the same appearance as a regular wax inlay, but, on the inner surface, a large portion of the investment material is exposed. The sprue is mounted in any casting ring and the entire mass thoroughly washed with soap and water.

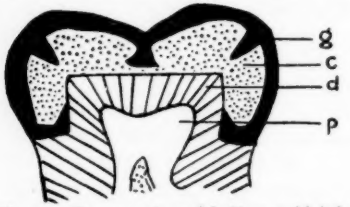


Fig. 1.—Cross-section of hollow gold inlay. *g*, gold veneer; *c*, cement body; *d*, dentin; *p*, pulp.

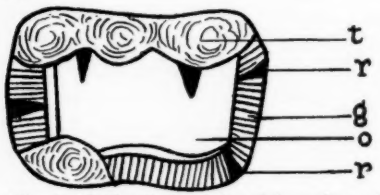


Fig. 2.—Occlusal view of mesiobuccolingual cavity, showing wax runners. *t*, tooth cusp; *g*, gingival floor of cavity; *r*, wax runners; *o*, occlusal floor of cavity.

INVESTMENT

To prevent warpage of the casting, the outer coat of investment must be as dense as the core of investment within the inlay. In order to obtain this result, the model is painted with a regular mix of investment and then investment powder is sifted over the painted model, which is vibrated until it takes up enough powder to give it approximately the same density that the core originally had. The remainder of the investment is used to fill up the casting ring. When the material is set, it is burnt out and cast.

The gold used in this casting must be very hard, preferably a gold with a high platinum content. A soft gold would not have the desired strength in a thin casting.

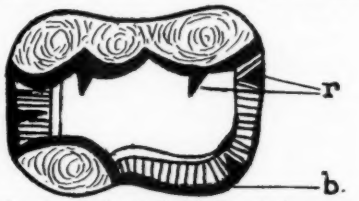


Fig. 3.—Occlusal view of mesioclusobuccolingual cavity, showing wax beading around margins of cavity. *b*, wax beading; *r*, wax runners.

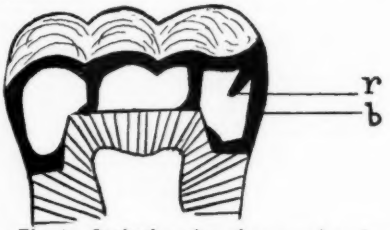


Fig. 4.—Sagittal section of prepared cavity, showing position of wax beading and runners. *r*, wax runners; *b*, wax beading.

Water immersion technic should not be used in this procedure because the wax is so thin that there is no appreciable amount of wax expansion to be overcome.

After the inlay is cast, the inner investment core can be removed from the inlay by repeated pickling in acid. Usu-

ally two or three picklings are necessary. From this point on, the inlay should be finished as is an ordinary inlay, except that it is most adaptable to use a jiffy tube in applying the cement to the hollow part of the inlay in setting.

In my hands, this technic is much easier than the one ordinarily employed, because the wax pattern seldom breaks, owing to the stiffness of the investment core.

OPEN FACED GOLD INLAYS

Occasionally, a gold inlay is objection-

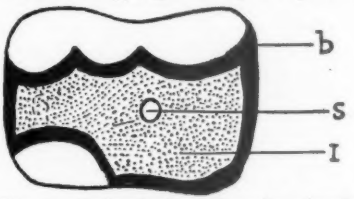


Fig. 5.—Occlusal view of cavity, showing investment material finished down to wax margins. *b*, wax beading; *s*, sprue hole; *i*, investment material.

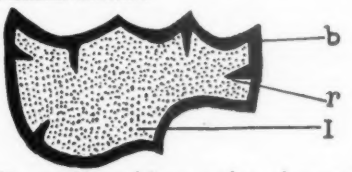


Fig. 6.—View of inner surface of removed wax pattern. *b*, wax beading; *r*, wax runners; *i*, investment material.

able because too much gold shows on the buccal surface. In these cases, it is desirous to have a porcelain window set in the gold inlay. I refer to this as the open faced gold inlay.

In the past, it has been very difficult to make an inlay with a window in it. By modifying the technic just given, it is a very simple and satisfactory operation. The procedure for this type of inlay is the same up to the point of laying the initial wax beading around the margin of the tooth in the amalgam die. After the wax beading and runners have been laid in the die, the wax beading along the buccal wall of the cavity preparation is carefully trimmed down until one thirty-second inch of the outer tooth margin is exposed. The wax is finished to this point as a thin beading.

The investment core is added as previously. After the core sets, it is trimmed down as in the previous technic except on the buccal surface, where the core should

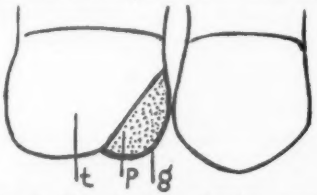


Fig. 7.—Buccal view, showing porcelain window in gold inlay. *p*, porcelain window; *g*, gold inlay. *t*, tooth.

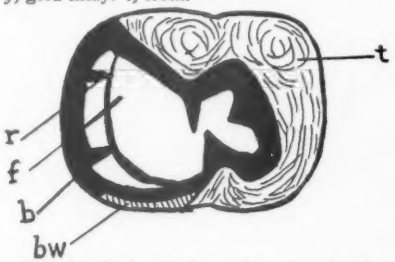


Fig. 8.—Occlusal view of cavity showing how wax beading sets back from buccal margin of cavity. *t*, tooth cusps; *f*, floor of cavity; *bw*, buccal wall of cavity; *b*, wax beading; *r*, wax runners.

be flushed with the tooth as we would want a porcelain window when finished to appear. Bearing in mind the appearance of the finished product, we cut away enough investment from the occlusal and interproximal surfaces to allow for the proper thickness of gold. (Fig. 10.)

Warm wax is added to the interproximal and occlusal surfaces and carved, and the investment material on the buccal

wall has the same appearance as the finished silicate window.

The former sprue is inserted, the pattern washed, invested and cast. It is then finished as in the previous inlay.

After this type of inlay has been satisfactorily fitted to the patient's tooth, the inlay is polished and placed back on the amalgam die, and a small piece of temporary filling or guttapercha is placed in the open window of the inlay. With a warm plastic instrument, this is carefully smoothed down to have the appearance that we desire the finished silicate window to have.

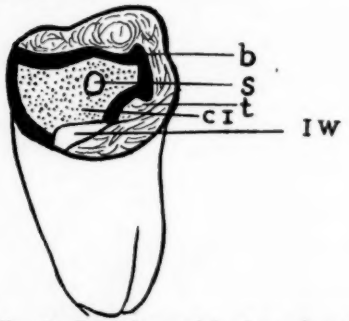


Fig. 9.—Buccoclusomesial view of tooth after investment has been carved. *t*, tooth; *b*, wax beading; *s*, sprue hole in investment; *ci*, carved investment on interproximal and occlusal surfaces. *iw*, investment flushed with tooth structure, to become silicate window.

The inlay is then thoroughly dehydrated with alcohol and cemented to the tooth as in the previous technic. When the cement is thoroughly set, the patient is dismissed. At the next appointment, the temporary filling is removed. A celluloid strip is carved as in Figure 11, and the finger guide of the strip is laid over the opening of the gold inlay. This serves as a matrix for the window.

A carefully selected shade of the silicate is mixed and placed in the cavity. The celluloid matrix is adapted and held over this filling material for five minutes. The matrix is removed, and a highly glazed, well-shaped porcelain window should be the result. This filling material is protected with a silicate varnish. The patient is dismissed and the window is finished at the next sitting.

This type of inlay usually makes a very artistic piece of work and is very satisfactory to the patient, but the patient is warned that the life of the exposed silicate is approximately from six to eight years. After this time, it is a simple matter to replace the window. After the operator has made one, he will find it a simple process in the future.

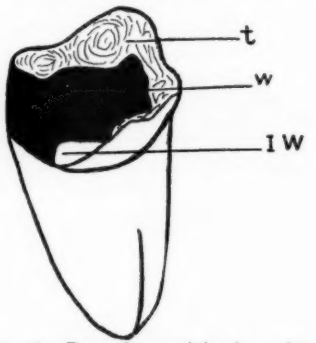


Fig. 10.—Buccoclusomesial view showing wax pattern. *w*, wax pattern; *t*, tooth; *iw*, investment window.

Fig. 11.—Diagram of celluloid strip, to be used in inserting silicate window. *fg*, finger guide for interproximal space. *b*, belly for cover of buccal window of inlay.

IS AN OPERATIVE PREVENTIVE MEASURE PRACTICAL?*

By THADDEUS P. HYATT, D.D.S., F.A.C.D., Brooklyn, N. Y.

DURING the past few years, much interest has been aroused regarding the value and importance of certain food elements and their nutritional value for the body as a whole and for the teeth in particular. As far as practical results have been obtained in the prevention of decay, I believe the greatest benefits have been secured by the dairymen, tomato and orange growers and the manufacturers of various and innumerable forms of cod liver oil.

I shall quote rather freely from certain articles regarding diet and caries. The first is a study carried on in the Department of Chemistry, Michigan State College.[1]

The specimens show clearly that the addition of liberal amounts of vitamins A, D or C, or of calcium and phosphorus, did not appreciably retard the decay of the teeth. *This points to a lack of direct relationship between any of these facts and the caries-producing process.* In making this statement it is not intended to minimize in the least the general importance of certain vitamins and inorganic elements, for their place in the diet is well recognized.

The experiments described in this paper present a simple picture of dental caries as it probably occurs in the majority of cases. *Two conditions must be fulfilled: the retention by the teeth of carbohydrate-containing foods, and the presence and action of acidogenic and probably of proteolytic bacteria.* When these conditions are fulfilled, destruction of the teeth takes place irrespective of the inner structure of the teeth; although it is obvious that the denser the structure, the slower will be the dissolution.

The practice of filling such pits and fissures, even before there is any evidence of decay, is believed, from the results of these experiments, to be fully justified, and worthy of general adoption by the dental profession.

In another carefully conducted study by the Mellon Institute, University of Pittsburgh, and the School of Dentistry, University of Pittsburgh, and under the critical care of H. E. Friesell, dean of the School of Dentistry, the following is taken from section C "Some Clinical Aspects of Dental Caries."[2]

When caries attacks a tooth it does not affect the tooth uniformly all over its exposed surface, but begins at points so definite on the various anatomical surfaces of the tooth that an experienced operator can readily predict where decay will begin on a given surface, and to what limits it will extend on that surface. Some areas of tooth surface are practically never attacked by the disease.

(While it is true "that an experienced operator can readily predict where decay will begin on a given surface" it is

*Read before the Greater New York Meeting, Dec. 7, 1933.

1. Hoppert, C. A.; Webber, P. A., and Carniff, T. L.: J. D. Res., 12:161 (Feb.) 1932.

2. Enright, J. J.; Friesell, H. E., and Trescher, M. O.: Studies of Cause and Nature of Dental Caries, J. D. Res., 12:759 (Oct.) 1932.

also true that the *most experienced operator cannot* tell to what extent decay will extend beneath that surface. It is the latter fact that makes prophylactic odontotomy so important.)

If caries is discovered early in pits and fissures, and the decayed tissue is removed and the cavity properly filled, no recurrence of decay around the margin of that filling will follow and there will be no further decay on that surface of the tooth.

In view of G. V. Black's statement that "decays beginning in the depths of pits have no opportunity to spread upon the surface of the enamel,"[3] and since Dr. Bödecker tells us "if we take into account the fact that caries soon widens the *base* of the fissure to ten times its original width without opening the entrance,"[4] why should we wait until we can see the decay? Careful clinical studies of pits and fissures in children under 6 years of age which revealed no decay at the surface even with the aid of a stomatoscope did reveal decay at the base in 52 per cent of cases. If we can protect the tooth at this point of susceptibility even after decay has started, how much more simple it is to protect this point before decay can start, and with far less loss of tooth structure.

TABLE 1.—PITS AND FISSURES IN MOLARS

First Molars	Per Cent
228 lost	57.0
152 caries	38.0
18 perfect	4.5
2 pits and fissures	0.5
Total	100.0

Second Molars	Per Cent
97 lost	24.25
286 caries	71.50
18 perfect	4.00
1 pits and fissures	0.25
Total	100.00

An interesting article[5] by one of our foremost investigators of the nutritional value of foods, Russell W. Bunting makes the following statement:

Many hypotheses have been advanced regarding the nature of these dietary deficiencies. Some investigators have claimed that a lack of calcium or phosphorus is the chief cause of dental caries. Others are equally confident that certain of the vitamins are the most important factors. A great deal of dietary experimentation has been carried on in animals and in children in the prevention of dental diseases. As yet, no such dietary panacea has been found.

In another paper, Dr. Bunting tells us that they could not find any consistent difference in the calcium, phosphorus or p_H of the blood or saliva of those with or without caries.[6]

From a recent book on the histopathology of the teeth, I quote the following:

In view of the occurrence of fissures of the type illustrated in Fig. 60, one is again reminded of the extreme difficulty of giving a satisfactory explanation of the problem of dental caries. There is no doubt that such a steep, narrow cleft in the enamel presents an ideal breeding place for micro-organisms; *still in some mouths such fissures or deep grooves stay intact throughout life, while in other individuals all occlusal fissures show extensive decay.*[7]

From this quotation, we would infer that there are a considerable number of pits and fissures in which decay does not

3. Black, G. V.: Operative Dentistry, Vol. 1, Chicago: Medico-Dental Publishing Co., 1908, p. 85.

4. Bödecker, C. F.: Bacteria in Relation to Enamel Fissure, D. Items Int., 48:800 (Nov.) 1926.

5. Bunting, R. W.: Literary Digest, Oct. 21, 1933.

6. Bunting, R. W.: Pacific D. Gaz., 41:738 (Sept.) 1933.

7. Kronfeld, Rudolf: Histopathology of the Teeth and Their Surrounding Structures, Philadelphia: Lea & Febiger, 1933, pp. 83-84.

occur even though there is present the three conditions necessary for the beginning of decay.

To ascertain how many occlusal surfaces of first and second molars have pits and fissures which have not decayed, we examined 100 persons between the ages of 30 and 40. Fillings are counted as carious cavities. Results are shown in Table 1.

The number of pits and fissures which are left in adults between 30 and 40 is so small that, for all practical purposes, they are a negligible factor in any study of the prevention of decay in those places. As we are dealing with actualities, every pit and fissure should receive attention at once. Another reason for this operative procedure in the presence of precarious pits and fissures is the fact that, at the present time, there is no practical means of determining which is the one exceptional pit or fissure in which food débris and bacteria will remain inactive and fermentation will not take place and produce the acids which destroy the tooth.

What are the actual conditions which confront us today? When we find a compound carious cavity or filling, we cannot tell in which surface decay first started. Many careful operators have found occlusal caries penetrating so close to the distal or mesial surface that it became necessary to make a compound filling. This is particularly true with bicuspid teeth. A fairly accurate picture of the relative liability of the different surfaces would be secured should we count each surface involved in all compound cavities and fillings.

In the following tables, this has not been done, for reasons which will be explained. Precarious pits and fissures are not included, because they were not recorded at the time that the data were collected. These figures are taken from a study of 2,040,480 surfaces of 408,096 teeth in 12,753 persons of all walks of life and ranging in ages from 16 to 69.

Table 2 shows the liability of the buccal surfaces of the six lower molars as compared with those of the mesial and distal surfaces. To emphasize and make more striking the far greater liability of the buccal surfaces of these teeth, all compound cavities or fillings which take in the buccal surface have been excluded in the figures for buccal surfaces, but when these compound buccal fillings and cavities take in the mesial or distal surfaces, they have been included in the figures given for the mesial and distal surfaces. For example, while all buccal-occlusal fillings or cavities are excluded entirely, all buccal-distal and buccal-mesial fillings and cavities have been included in the figures for the mesial and distal surfaces.

We should remember that the position of the buccal surfaces of the lower molars is such that they are more easily kept clean than the mesial or distal surfaces.

TABLE 2.—LIABILITY OF SURFACES OF LOWER MOLARS TO CARIES

Simple cavities, buccal		9,624
Simple cavities, distal	827	
Simple cavities, mesial	1,715	
Compound distoclusal and mesioclusodistal	1,911	
Compound mesioclusal and mesioclusodistal	2,248	
Compound distolingual, distobuccal, mesiolingual and mesiobuccal	449	
Total		7,150
		2,474

This being true, it can hardly be questioned that the reason for the greater susceptibility or liability of the buccal surfaces to caries as is shown by the figures in Table 2 is entirely due to the imperfect union of the lobes at this surface. This leaves an opening in which food débris and 8,000,000,000 bacteria can lodge, undisturbed by mastication or brushing.

The bacteria themselves have no direct pathologic action on the structure of the tooth, nor have the carbohydrates when no bacteria are present. It is only when the carbohydrates remain still and undisturbed that the bacteria can take advantage of this condition and, living within the stable and favorable environment afforded by pits and fissures, they then produce those acids which are strong enough to break down the inorganic salts of which the teeth are built. Acids of this strength are not produced by the free-moving bacteria of the mouth.

Precarious pits and fissures are generally found in the occlusal surfaces of molars and bicuspids, the lingual surfaces of upper molars, upper lateral and central incisors and the buccal surfaces of lower molars. This will give us a total of thirty-six surfaces, 124 other surfaces remaining.

In Table 3, we have again given the benefit of the doubt to the thirty-six pit and fissure surfaces. In other words, we have assumed that the decay of all compound cavities started in one of the 124 surfaces and not in one of the thirty-six surfaces.

Though we have added all the compound caries to the 124 surfaces, we still find that the liability is four times (3.9) greater for the thirty-six surfaces than for the 124 surfaces.

These figures should teach us that one important measure for the prevention of decay can be directed to those surfaces where precarious pits and fissures are found.

TABLE 3.—SURFACES AFFECTED BY CARIES

The thirty-six surfaces	
Occlusal surface of molars and bicuspids	79,218
Lingual surface of upper molars, lateral and central incisors	7,544
Buccal surface of lower molars	9,624
Total	96,386
The 124 surfaces	
Occlusal surface of incisors and occlusomesial, occlusodistal, occlusolingual, occlusobuccal	955
Mesial surface and mesioclusal, mesioclusodistal, mesiolingual, mesiobuccal	34,781
Distal surface and distoclusal, distoclusomesial, distolingual, distobuccal	37,048
Lingual surface and linguoclusal, linguodistal, linguomesial	3,418
Buccal surface and buccoclusal, buccodistal, buccomesial	9,481
Total	85,684

The success of an operative measure for the prevention of caries in definite and specific places in certain teeth is based on the following facts:

The free acids of the mouth do not cause decay, and the free bacteria of the mouth do not cause decay, but the undisturbed retention of food débris, carbohydrates and bacteria is essential for the beginning of decay.

The shape or conformation of any part of the tooth which facilitates, or makes possible, the undisturbed retention of food débris, carbohydrates and bacteria increases the liability of these places and

makes possible the beginning of decay in these definite locations.

In a study made by Walter A. Bossert on "The Relation Between the Shape of the Occlusal Surface of Molars and the Prevalence of Decay,"[8] it was found that type 4 is three times more liable to pit and fissure caries than is type 1. Is it not possible that diet's greatest value as a preventive of dental caries will be its influence during the building period of the tooth and before its eruption? May it not be that type 1 is the result of a well-balanced diet for the expectant mother and infant child, while type 4 is the result of an unbalanced diet? We cannot help noticing that in most of the work done along nutritional lines, the sad lack in, and often the complete absence of, any study regarding the shape or formation of the teeth. Time and money

Various shapes of occlusal surface of molars.

spent only to determine the calcium and phosphorus content of the blood or saliva are the same for those with carious teeth and those without. The bacterial content of the mouth is almost but not quite the same. We would expect to find more acid close to holes in which acids are being formed, and also to find more acid-forming bacteria in such mouths. And we would expect also to find less acid-forming bacteria in mouths that have no bacterial laboratories.

Regardless of what school dietitians may belong to, whether the cod liver oil, or the tomato class; or the A, B, C vitamins, all accept one truth, namely, that the undisturbed retention of bacteria and food débris is absolutely essential for the beginning of decay.

It was J. Leon William who, after many years of careful investigation regarding dental caries, first coined the phrase "A clean tooth does not decay." Why did Dr. William make such a statement? Because, it is an actual fact that those parts of the tooth which, by mastication, or careful mouth toilet, are kept free from the undisturbed retention of food débris and bacteria do not, never did and never will decay. In spite of the fact that some members of our profession and the medical profession and professors of education have publicly stated that this slogan is an old superstition, not one single investigator has as yet produced any evidence that this statement of Dr. Williams' is not as true today as it was the day he first made it public.

Frequently, in the building of a tooth, the coalesence of the lobes is not perfect. This leaves small openings between the lobes. These openings may be at the surface, or part way down between the lobes, or they may extend from the surface all the way to the dentino-enamel junction. Some of these openings are sufficiently large to admit the point of a fine explorer and so are detectible. There may be other openings so small as to be undetectible. As it is impossible to detect these defects by ordinary clinical methods, they are outside the field of practical operative measures and are therefore excluded in this paper. Let us hope that diet and the control of the dental lymph may have much to do with the protection of these undetectible defects and with making them resistant to caries.

Any operative procedure which can change the shape or form of these detectible defects, so that food débris can no longer remain undisturbed by mastication and toothbrushing, reduces at once the liability of these places to decay.

8. Bossert, W. A.: J. D. Res., 13:125 (April) 1933.

When this procedure is applied to defective but noncarious teeth and it protects them from becoming decayed, it constitutes preventive dentistry. The practicability of this procedure lies in its simplicity.

With the use of fine pointed explorers and small instruments, we can cut out these harbors which protect the bacteria and, placing a small filling therein, we make the small hole no hole, and thus protect this surface against dental caries. This operative procedure has been named by E. Melville Quinby, of Boston, "prophylactic odontotomy."

By the application of this practice in our daily work, we shall not only confer on our patients the most valuable operative service it is possible to confer, but we shall also support the official action of our chosen profession as expressed by twenty state dental societies, eighteen other dental organizations, the A.D.A., the Canadian Dental Association and the International Dental Federation Commission on Hygiene in the following resolution:

> Resolved, that in the aim to attain prevention of systemic and dental disease:
>
> (*a*) No defect is too slight to receive definite attention.
>
> (*b*) The temporary teeth should receive as much care as the permanent ones in order to promote the proper development of the jaw and head to maintain function;
>
> (*c*) Particular care and attention should be given to developmental pits and fissures, whether occurring in primary or secondary teeth, or whether decay is or is not present.

This resolution has been adopted by the following associations: American Academy of Dental Science, American Dental Association, American Society of Orthodontia, Canadian Dental Association, Dental Hygiene Council of Massachusetts, Dental Society of New York, First District, Kings County Dental Society, Eastern County Dental Society, Queens Dental Society, North District Dental Society, Harlem Dental Society, Greater Boston Dental Society, F.D.I. Commission on Hygiene, New York Academy of Dentistry, New York Society of Orthodontists, Odontological Society of Western Pennsylvania, Dental Society of New York, Second District, Boston Society for Dental Improvement, Oral Hygiene Committee of Pennsylvania, Oral Hygiene Committee of Greater New York and Tufts Dental Alumni; and the following state dental societies: California, Connecticut, Colorado, Idaho, Illinois, Massachusetts, Montana, Nevada, New York, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, Vermont, Washington, Indiana, Michigan, New Jersey.

I do not believe that all these dental organizations would advocate a "doubtful procedure."

It should be understood that no member of the Hyatt Study Club advocates or ever has advocated the cutting out of grooves, sulci or fossae. Nor have they advocated the cutting of a nondefective tooth.

CONCLUSION

Prophylactic odontotomy prevents the accumulation of carbohydrates in an uncleanable place.

Prophylactic odontotomy prevents the localization of undisturbable bacteria at a definite point.

Prophylactic odontotomy prevents the small hole's remaining a protected laboratory for the production of those acids which break down the substance of the tooth.

OSTEOMYELITIS OF THE JAWS*

By FRED Z. HAVENS, M.D., Rochester, Minn.

OSTEOMYELITIS is an inflammatory disease of bone usually originating in the soft tissue of the medulla, from which extension to other parts of the bone may, and frequently does, occur. The process leads to thrombosis of nutrient vessels, as a result of which portions of the involved bone are deprived of their blood supply and death of the part follows. This portion is then cast off by suppuration and by the formation of sequestra.

Separation of a portion of the bone in this manner, sometimes referred to as necrosis, may result also from the effects of certain poisons, such as phosphorus or mercury, as well as from infective processes such as periostitis. Another form of dissolution of bone, which occurs without the separation of sequestra, is known as caries. This form, which is seen in cases in which the infection is subacute, is best illustrated by the reaction of bone to infection with tuberculosis.

A condition which is the opposite of dissolution is seen in certain cases of chronic inflammation. In these, the bone-forming tissues respond to the stimulus of the long continued low-grade infection by laying down new, dense bone. This is referred to as sclerosis.[1]

The jaw is eighth in order of frequency of involvement by osteomyelitis. The bones most often involved, in order of frequency, are the femur, tibia, humerus, radius, ulna, vertebrae and calcaneus. The lower jaw is affected four to five times as commonly as the upper jaw. Among very young children, the upper jaw is more frequently affected than the lower. The disease affects males slightly more often than females, probably because the male is more frequently exposed to trauma. The largest number of patients are between the ages of 20 and 40 years.

Trauma plays an important part as a causative agent in producing osteomyelitis, either by providing a break in the tissues, through which infection may enter, or by producing a region of decreased resistance, in which blood-borne infection may localize and develop. Such trauma may vary widely in severity, from an injury producing fracture of the bone and laceration of the soft tissue to one which is so slight as to be scarcely noticeable.

Osteomyelitis may arise from periapical abscesses, especially when extraction is done in the presence of acute inflammation, or when the tooth socket is packed or curetted after extraction. Also, it may follow various operative procedures on the jaw or teeth, such as removal of cysts, or the now largely abandoned use of phenol or arsenic in the treatment of pulp chambers.

Acute osteomyelitis of the blood-borne variety is dependent on the presence of

*From the Section on Laryngology, Oral and Plastic Surgery, the Mayo Clinic.

*Read at the Fifteenth Annual Meeting of the American Society of Oral Surgeons and Exodontists, Chicago, Ill., Aug. 4, 1933.

1. Brophy, T. W.: Oral Surgery, Philadelphia: P. Blakiston's Son and Co., 1915, pp. 237-242.

bacteria in the blood stream. These may come from furuncles, carbuncles, acutely inflamed tonsils or lesions in the alimentary or genito-urinary tracts, or they may be present in the blood during some systemic disease, such as influenza, typhoid fever or smallpox.

Because secondary infection may occur very promptly, it may be difficult to determine definitely the organism that is causative of osteomyelitis of the jaw. *Staphylococcus aureus* probably is most commonly the cause, although the streptococci and pneumococci are no doubt often responsible. The colon bacillus (or an organism closely resembling it) is often found in these cases, but it is probably present as a secondary invader more often than as the primary cause.

The pathologic changes and pathogenesis of osteomyelitis of the jaws differ somewhat from those of the disease when it affects the long bones, owing to certain peculiarities in the blood supply and structure of the jaws. In the long bones, it is generally understood that infective material in the blood stream lodges in capillary terminals in the region of the epiphysis, there to develop a focus which spreads in the path of least resistance, either in the medulla, or along the epiphyseal line to penetrate the cortex and burrow subperiosteally. In the jaws, there is the anatomic peculiarity that large portions of each bone receive their blood supply through multiple arterial loops derived from a single vessel. When the main vessel becomes involved in an inflammatory process and is occluded by a thrombus, death of that portion of the bone which it supplies takes place.[2] In addition, there is no opportunity for pus to remain confined in the jaws for a considerable time, as it may be confined, for example, in the upper end of the tibia. This is because the bones of the jaws are very thin in many places, and in others are provided with regions of diminished resistance by the sockets of the teeth. Thus, an inflammatory process quickly finds a point of exit and drains itself.

Practically all of the blood supply to the maxilla is derived from terminal branches of the internal maxillary artery (Fig. 1). The different vessels anastomose freely, so that when an infective process involves one of the lesser loops, there is only a minimal loss of bone. When such an accident occurs in the main artery, loss of the entire maxilla may follow.

In the mandible, the blood supply to each half is through the corresponding inferior alveolar artery. At the median line, there is anastomosis with the artery from the opposite side, and, at the mental foramen, there is intercommunication with the inferior labial and inferior coronary vessels. In addition, there is abundant periosteal circulation derived from the overlying soft parts. The condyle and the coronoid processes are supplied entirely by vessels from the surrounding tissues.

Thus, it can be understood readily that the amount of bone which will die as a result of vascular occlusion will depend on the situation and extent of the occlusion. If it occurs, for instance, in the inferior alveolar artery just posterior to the mental foramen, the intramedullary portion of the vessel proximad to this point is converted into an end-artery, so that if a thrombus extends proximally, practically all of the main part of the body of the mandible may be lost. A thin shell next the periosteum probably will be saved by circulation through the periosteal vessels, and the portion of the mandible anterior to the mental foramen will obtain sufficient blood from the opposite inferior dental artery and from the in-

2. Wilensky, A. O.: Osteomyelitis of Jaws, Arch. Surg., 25:183-237 (July) 1932.

ferior labial and inferior coronary arteries. The condyloid and coronoid processes rarely are lost because their blood supply from surrounding soft parts is abundant. The preservation of a thin shell of bone by the periosteal circulation is an important factor in the treatment of osteomyelitis of the mandible.

The symptoms of osteomyelitis of the jaws vary considerably. Within a few hours after extraction of teeth or other operative trauma, there is usually a sharp local reaction, with swelling, pain, elevation of temperature and general malaise. In the occasional fulminating case, the condition may progress rapidly to a fatal termination. Usually, in a few days, sufficient drainage is established to lessen the pain and lower the temperature, following which there ensues a long period during which there is drainage of purulent material, and ultimately sequestra are discharged before healing can take place. When the condition arises in the course of a systemic infection, the general symptoms of osteomyelitis may be masked by those already present, and the condition may be recognized only by the local signs. If the disease occurs as a complication of fracture or of some operative procedure in which the wound is wide open, there may be little disturbance other than local swelling and the appearance of a purulent discharge.

In osteomyelitis of the maxilla that occurs in nurslings and infants, there is usually a characteristic picture. Much has been written about this condition, and it has been regarded by some writers as a separate entity. The underlying pathologic change is the same as that which occurs among adult subjects, except as modified by the fact that the maxilla of the infant is composed of a greater proportion of cancellous bone, with numerous tooth buds, some of which lie close to the orbit.[2] The disease occurs in infants aged from 2 weeks to 9 months. The onset is sudden; the child is acutely ill, and death may quickly ensue. Early signs usually are marked swelling of the lids of one eye, unilateral purulent conjunctivitis and nasal discharge, together with swelling and softening of the upper gums and of the palate on the same side.[3]

Trauma, such as might occur from injuries received at birth, from the nursing bottle, or from the fingers of the nurse when cleansing the child's mouth, is thought to be the chief factor in this disease, although undoubtedly in some cases it arises from blood-borne infection secondary to such conditions as furunculosis or impetigo. In approximately a fourth of these cases, the disease progresses rapidly to a fatal termination. In the remainder, the course of the disease is similar to that in adults.

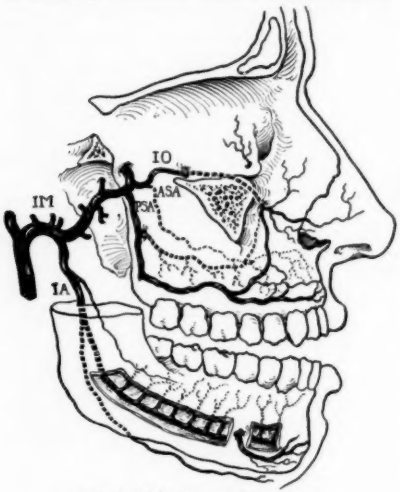
The most common complication of osteomyelitis of the jaw is formation of abscess in the adjacent soft parts, due either to direct extension or to suppuration of the regional lymph nodes. As septicemia with its grave prognosis is encountered occasionally, sometimes appearing early, it may be a question as to whether the osteomyelitis arose from the septicemia, or the reverse. Rarely, phlebitis may occur in the facial vein with upward spread to produce thrombosis of the cavernous sinus. Cerebral abscess, meningitis, pansinusitis, erysipelas and tetanus have all been noted. Late complications sometimes seen are deformities of various types due to loss or maldevelopment of bone, and ankylosis of the temporomandibular joint due either to destruction of bone in the region of the glenoid fossa or to scarring of the soft tissues.

The diagnosis of osteomyelitis of the

3. Bass, M. H.: Acute Osteomyelitis of Superior Maxilla in Young Infants, Am. J. Dis. Child., 35:65-70 (Jan.) 1928.

jaws is usually fairly evident from the local signs that follow soon after trauma, or that appear in the course of acute illness. Mistakes are sometimes made on account of the lack of positive roentgenographic findings. The roentgenogram will reveal no changes in bone in the very early stages, and one must depend on clinical judgment in interpreting signs and symptoms.

Certain blood dyscrasias, notably acute leukemia and agranulocytic angina, occasionally give rise to extensive necrotic le-



Arterial blood supply of jaws.

sions of the jaws, but in such conditions the lesions are likely to be bilateral, and examination of the blood, which should be made in all cases, will point the way to the proper diagnosis.

Actinomycosis rarely should cause confusion, for the process is slow in onset, usually requiring from two to six weeks or longer to develop. Infected cysts or odontomas may give rise to acute symptoms, but ordinarily it is possible to demonstrate these by means of roentgenograms.

Only a relatively small percentage of patients die. An exception to this is found in cases of osteomyelitis of the maxilla in nurslings and young infants, among whom the mortality rate is about 25 per cent. Deformity or loss of function depends to a considerable extent on the treatment. Ivy says: "By attending to proper drainage and . . . by removing sequestra as they form, it is possible to have the lost bone almost entirely replaced by new bone, with avoidance of great deformity and interference with function."[4]

Once osteomyelitis of the jaws has developed, treatment should be very conservative, and is well summed up in the statement just quoted from Ivy.

The situations resulting from the manifold variations and complications must be dealt with according to the requirements of the individual cases. Measures that may need to be applied are drainage of secondary abscesses, supportive treatment by means of intravenous medication or transfusion, for the patient who exhibits toxic manifestations or general sepsis; and a liberal diet, administration of cod liver oil and exposure to fresh air and sunlight for the patient whose disease is prolonged. Otherwise, plenty of time should be allowed for the involucrum to form and the sequestrum to separate. This, in the main, is the foundation for success.

Prophylaxis should be carefully considered, in order to avoid some of the conditions which might lead to the development of osteomyelitis. Wilensky has said: "Most of the cases seen in practice are the result of unwise dental procedures or as unexpected consequences of apparently necessary manipulations even in very capable hands." If close attention is paid to asepsis and to gentleness of manipulation, if packing and curetting of tooth

4. Ivy, R. H.: Disc. of Cameron, J. R.: J.A.M.A., 85:1802 (Dec. 5) 1925.

sockets is discontinued and if extraction is not performed in the presence of acute inflammation, the incidence of acute osteomyelitis will be greatly reduced.

DISCUSSION

Earle H. Thomas, Chicago, Ill.: A certain type of so-called oral surgeon would not receive this paper with very great enthusiasm because it does not tell him that A hours after the onset of certain symptoms he should take a B instrument, manufactured by C company and, using D anesthetic, he should insert B instrument E inches from point F and make an incision G inches deep and H inches long in an I direction; after which he should pack with J inches of K gauze, made by L company, and insert it in the incision just made, etc. In other words, such men would not appreciate this paper because they know nothing of the fundamental principles of either pathology or surgery. All they can do is to try to imitate what they have seen someone else do, or attempt to follow some definite technic that they have read. If an oral surgeon has had the misfortune to come in contact with many operations performed by this type of professional man, and most of us have had and continue to have such misfortune, and if this oral surgeon would stand near a booth in a dental convention where an enthusiastic salesman is selling surgical instruments, he would soon arrive at the conclusion that many practitioners think that a set of surgical instruments plus a few hints from the salesman make a wonderful oral surgeon. As I said, this type of oral surgeon would not appreciate the paper by Dr. Havens. However, Dr. Havens has paid the members of this society the compliment of recognizing that we are not to be placed in the category of the men above mentioned. He therefore has prepared a paper which has a distinct appeal to our members, one which is truly scientific and which covers thoroughly the fundamentals of the anatomy and pathology involved in the subject matter. In discussing other phases of osteomyelitis, he makes two statements that are music to the ears of the experienced surgeon but which are discord to the type above mentioned. 1. "One must depend on clinical judgment in interpreting signs and symptoms." 2. "The situations arising as a result of the manifold variations and complications must be dealt with according to the requirements of the individual case." Dr. Havens mentions the lack of positive roentgenographic findings in the early stages of osteomyelitis. Roentgenographic changes are not in evidence until the calcium salts have been absorbed from the bone tissue, and this may not occur to an appreciable extent for several days. After the disease process has reached the stage where a great deal of bone absorption is observed roentgenographically, one is often inclined to condemn involved teeth, especially when they do not respond to a vitality test. The pulps of these teeth usually remain vital even though they do not respond to a vitality test and, furthermore, the amount of bone absorption is no indication of the amount of recalcification that will take place after the infection has been overcome, or of the amount of pericemental reattachment that may take place in the future. Therefore, though clinical judgment may warrant the decision that certain teeth be removed, in general teeth should not be removed, regardless of their roentgenographic appearance and no matter how loose they become. A period of at least six months must elapse before it can be definitely determined, roentgenographically and clinically, that certain teeth must be removed. Dr. Havens emphasizes that surgical treatment consists of drainage and the removal of sequestra. Efficient drainage, as soon as the diagnosis can be made and preferably before there is any marked swelling of the soft tissues, will prevent many of the complications of osteomyelitis and will avoid the necessity of losing very many teeth. In my opinion, the conservative method of obtaining sufficient drainage is by generous incision to the bone opposite the apices of the involved teeth. This incision is made usually on the labial or buccal aspect, including possibly the lingual of the maxilla when it is involved, and is followed by stripping the periosteum from

the bone, exposing a considerable area. This stripped surface should be kept exposed by an iodoform gauze pack until all pus formation has ceased and until all sequestra have been removed. The earlier this procedure is followed, the less will be the amount of bone becoming necrotic, and, in some cases, if diagnosis is made during the first or second day, necrosis may be avoided. Such treatment usually gives marked relief from pain and general symptoms because of efficient drainage through the multitudinous small openings usually penetrating the outer cortical plate of the jaw. There are times when the sequestra are not removed as soon as they have separated. I refer principally to cases wherein a large area of the maxilla or mandible, and especially the latter, has become necrotic. If this sequestrum is removed, the periosteum will collapse with resulting disagreeable deformity unless a splint is placed in position to preserve the periosteum in its normal contour until it has built up a sufficient layer of new bone to restore bony contour. In such cases, what better splint can we find than the sequestrum itself which is of proper size and shape? During the time that this sequestrum is retained, of course sufficient drainage must be maintained to avoid the formation of pus and the absorption of toxins into the general system. In referring to the prophylaxis of osteomyelitis, Dr. Havens has emphasized many important points, most of which could be included in his phrase "the avoidance of unwise dental procedures." A few years ago, there were referred to my office in one week five cases of osteomyelitis of one half the mandible and one case of gangrene of the cheek in a physician, all caused by the injection of procaine into acutely infected regions. Osteomyelitis is just one of many serious disease conditions that occur around the mouth and which may involve life itself, and it behooves each and all of us to have a greater respect for the latent possibilities in apparently minor conditions. Above all else, we should strive for greater knowledge of the fundamental pathologic processes that take place in the various conditions, for with this knowledge appropriate treatment of any condition at any time will naturally follow.

R. S. Hopkinson, Milwaukee, Wis.: Unless I misunderstood, Dr. Havens drew a wrong conclusion. I would caution him in using the word "packing." We use that word in connection with packing a wound to control a hemorrhage. I would suggest that "insertion of drains" would indicate what the operation was for, and not assume that it was to prevent drainage. Furthermore, he stated "that if curetting and packing were discontinued, the occasion of osteomyelitis will be minimized." I wish to say, from my clinical experience, that in spite of adequate surgical procedure, and the most careful technic, we have no control over the virulence of the organisms in the mouth. Neither have we any control over the resistance of the host, namely, the patient, and those are the things that sometimes get us into trouble even when we are very careful. The curet, in the hands of the man who is not trained, is a dangerous instrument. His tactile sense does not prompt him to recognize the difference between infected tissue and normal tissue, and if we as oral surgeons could impress him with the idea that he ought to visualize his field and actually "see" the infection, when he is operating, he wouldn't make those mistakes. I wish that the dental profession could appreciate how easy it is to do something that might promote "osteomyelitis." Given an area in the jaw with virulent organisms and a patient with a low resistance, with no so-called acquired immunity and more than the ordinary amount of trauma, and the possibility of "osteomyelitis" is a very great one. Osteomyelitis may commonly follow in the wake of a bad fracture of the jaw, when there has been no packing done, no curetting or anything of that kind. Trauma in that case lowers the resistance of the local tissues and allows these virulent organisms to become active and a danger to the patient. Papers like this stimulate caution and inspire respect for an infection that may become so seri-

ous, that the life of the patient is involved.

M. F. Wielage, Miami, Fla.: We are apparently living in a transition period where we find out that each individual can have his own opinion about a condition, even though he is violently opposed to what has been said before. It has always seemed strange that we, who are oral surgeons and dealing with bone, hear very little about physiology or bone formation. Many of us still have the idea that bone is a solid substance. There is a living colloidal state of mineral metabolism which underlies the manifestations that we know in bone. The discussion so far has been more or less one of surgical or mechanical application. Nothing has been said about the predisposing causes of these bone disturbances. One could not build a brick house without brick, and if these patients are using up the minerals necessary to mass precipitation in the jaw bone, how can one expect normal bone formation in a case of osteomyelitis? We are in a transition period; we are stepping from the bacteriologic to the biophysicochemical. We do not have to fear infection so much as we have in the past. We find that physical chemistry brings out certain data that bacteriology was unable to explain. It is true that many of us carry these so-called disease-producing organisms. We have carriers, and still they do not have the manifestation of the disease. Unfortunately, the followers of Pasteur have carried this thing too far. After all, everything is theory, and a theory is only good when we can make use of it in the explanation of certain phenomena that we have no other explanation for. It is not my intention to condemn bacteriology or to belittle bacteriologists. They have done very wonderful work, and we will have to make use of bacteriology in the future; but physical chemistry and biophysics and chemistry bring out certain facts that answer more doubtful questions than bacteriology has ever been able to answer. Bone is in a colloidal state. We have talked about densification, but I believe a more scientific name today would be flocculation. There are many causes for these conditions. I saw a case of osteomyelitis that had been referred by the internist to an orthopedic surgeon. He immediately decided to operate from the outside and he missed his goal by 1.5 cm. After the patient had been relieved of a tic douloureux by means of an alcohol injection, we were able to take an intra-oral roentgenogram and we found a root lying in the mandible. The medical man said, "We will operate immediately." We said, "This is not the time to operate." We made a blood chemical determination and found the patient had a calcium balance of minus 26. How could we expect a successful result from immediate operation? No matter how wonderful a surgical technic is, if the patient is not in condition to lay down normal bone, the end result will not be satisfactory. After the calcium balance was brought up to approximately 55, we operated. This case, by the way, was one of over five years' standing and the patient had been sent down to Miami to recuperate in the sunlight. After the proper treatment, the case cleared up in a month and a half. Incidentally, when the patient came to Miami, her blood pressure was 250. It dropped to 165, and the woman had an entirely different appearance. When we talk about the underlying causes of osteomyelitis, we must consider mineral metabolism. That is at the present time coming to the front. It is a question of transition. We cannot manipulate bone or expect recuperation in bone if we pay no attention to providing the means or the hormones or minerals that are needed to precipitate bone in the area where we are working. In these times of depression, when something was said about going from pyorrhea surgery to plastic surgery, I believe another suggestion might be that we qualify ourselves more thoroughly regarding the systemic aspect of those mouth conditions which are really manifestations in the great majority of cases of a systemic disturbance.

Dr. Havens: Sometimes it is necessary to exaggerate in order to emphasize a point. I have seen occasions for packing; I have seen occasions for curetting; but both methods should be used with a great deal of caution, and only experience will teach

one when they may be employed. Without such experience, it would be better never to pack and never to curet after dental extractions. It, of course, goes without saying that there is no way of judging accurately either the virulence of the infection that may be present or the resistance of the patient. In the discussion of Dr. Shearer's paper, someone mentioned an unfortunate incident involving the death of a dentist following extraction of teeth. Catastrophies like this will happen occasionally in spite of our best efforts. To my mind, there are three main factors in such a patient's failure to recover postoperatively: (1) trauma; (2) infection, and (3) the patient's resistance. The patient may survive severe trauma if virulent infection is not present in the mouth, or if his resistance is high. He may survive severe trauma in the presence of virulent infection if his resistance is high. But occasionally there exists a combination of low resistance and virulent infection, and then even slight trauma may result in disaster. Dr. Blair of St. Louis, whom most of you probably know, some time ago published an article in which he gave a discussion of the "ulcerated tooth," which he defines as "an acute exacerbation of a previously quiescent periapical infection." He made the point that pulling the tooth is not going to take care of the trouble, and results are not comparable to what the general surgeon accomplishes by removing an acutely inflamed appendix. The latter removes the trouble because the infection is contained within the appendix but when the dentist pulls an "ulcerated tooth," he is only pulling out a plug and the infection remains underneath. But if the problem is approached as Dr. Shearer suggests, allowing free exit to all the infection, and if the manipulations are gently done, a good result probably will be obtained. Dr. Wielage is quite right: There are many factors coming to the fore today in studies of metabolism, various diseases which are now being recognized, hyperparathyroidism, etc., which are known to have a very pronounced effect on the calcium balance in the body, and it is logical that we look carefully into the general condition of the patient before we undertake any of these major procedures, as this may be the deciding point as to whether the work on that patient is a success or a failure.

POSTEXTRACTION INFECTIONS: PRELIMINARY REPORT ON THE ORAL FLORA

By P. H. BELDING, D.D.S., and L. J. BELDING, M.D., Waucoma, Iowa

FOR several years, we have been studying the bacterial flora associated with specific gingivitis, and, more recently, we have been investigating its relationship to the postextraction infections. As we have previously demonstrated, more than 75 per cent of the adult dentulous population have chronic specific gingivitis, which is potentially formidable in that at any time it may become acute. In spite of the statements of numerous writers that they terminate the treatment of an acute fusospirochetal infection only after they have secured three negative smears, we wish to somewhat dogmatically state that, after this infection, it is almost impossible to eradicate the spirochetes from the oral cavity as long as the gingivae exist.

Fortunately, the gingivae and associated structures are extremely resistant to disease, and most extractions are not

followed by an infectious process. It is inevitable that every student of the oral cavity will be called on, sooner or later, to diagnose and treat the various postextraction complications; and in that they may be sufficiently severe to cause extreme pain, profound illness and even death, it is essential that their etiology, diagnosis and treatment be thoroughly understood. It is of vital importance that the early signs and symptoms be recognized; for, if these infections are diagnosed in their incipiency, they can be aborted. It is of further importance to recognize that, by the timely and judicious use of prophylactic measures, it is possible to prevent these complications.

These infections, which, as the name implies, are complications which develop after extraction or other mechanical manipulation in the oral cavity, include those autogenous acute fusospirochetal reactions which follow no demonstrable trauma; for, with the exception of the precipitating factor, there is no essential difference between them.

The postextraction infections may be classified as follows:

Dry socket, primary or secondary.
Postoperative pain.
Cellulitis.
Phagedenic gingivitis.
Infections in contiguous areas.
Lung abscess.

Since the currently held theories regarding the composition, significance, function and potentialities of the oral flora meet present scientific demands so bizarrely and inadequately, we feel obligated to present a few theories on the bacteriologic aspect of this problem. As the result of years of research in this field, the isolation and cultivation of most of the associated organisms, the study of an untold number of slides, and thousands of hours of direct microscopic and darkfield observation, followed by the clinical application of our deductions to the treatment of hundreds of cases, we feel capable of presenting a fair evaluation of the present status of oral infection.

For all practicable purposes, as far as dentistry is concerned, every infection in or about the mouth, with the exception of caries and an occasional case of focal infection, is caused by the activity of the fusospirochetal organisms, the fusiform bacilli and streptococci, both generally innocuous, and the pathogenic spirochetes. The organisms of this association have variable oxygen requirements. Spirochetes and the streptococci are unable to grow in the presence of air. The fusiform bacilli vary among themselves in this capacity, some of them growing luxuriantly in mediums open to air. Others are extremely obligate anaerobes, and all of them can apparently grow in the absence of free oxygen.

With the exception of an occasional spirochete which wanders into the oral cavity from a diseased tonsil, this organism cannot be demonstrated in the edentulous mouths of men or animals; for the gingival crevice is the only place in the buccal cavity which provides the strict anaerobic habitat which it demands. On the other hand, fusiform bacilli make their appearance shortly after birth and, irrespectively of the presence or absence of the gingival structures, can be demonstrated in abundance until death. It is interesting to note in passing that specific gingivitis, including so-called "Vincent's infection" (a deplorable term), is limited to the dentulous age; that is, irrespective of the presence of fusiform bacilli in abundance, no teeth, no gingivae, no spirochetes, no fusospirochetal disease.

As far as we have been able to determine from our work and the studies of others, the streptococcus element, in spite of its constant association with this com-

plex, is apparently not essential for its activity.

The fusiform bacilli grow luxuriantly in the fissures of the tongue, on artificial dentures and in the gingival spaces, filling the latter site with a zoogleal mass which extends in a mucilaginous, gelatinous sheet up over the enamel layer of the teeth, forming what is commonly referred to as the salivary mucin plaque. Careful microscopic examination demonstrates that the deeper layers of "film" are composed almost exclusively of fusiform bacilli and their products, other bacteria being either extremely rare or entirely absent. The efficacy of this film as a barrier to the entrance of free oxygen is attested by the constancy with which extremely obligate anaerobic forms can be isolated from its depth.

The zoogleal mass found in the gingival space and extending up over the enamel is composed of various kinds of fusiform bacilli, which differ among themselves mainly in their oxygen requirements. Some of them grow readily in air, while others are obligate anaerobes. The facultative forms growing in the peripheral zone of this mass sufficiently deplete the oxygen to allow for the growth of the obligate anaerobic forms within its depth. Thus, this film portends the development of that group of diseases, gingivitis and pyorrhea, which are caused by the activity of the anaerobic organisms.

This film permits the development of gingivitis and pyorrhea; for its mass is easily penetrated by the motile spirochete and provides the food and anaerobic habitat which is essential for its initial invasion and continued existence in the oral cavity. To that extent, and to that extent only, are the fusiform bacilli symbiotic with the spirochetes. We believe that this is the first time that the relationship of the fusiform bacilli to the spirochetes has ever been scientifically explained.

As we have previously demonstrated, the increased incidence of mouth infections is but secondarily related to the progress of civilization. The essential factor is the resultant increase in social contacts, particularly the development of the penchant for promiscuous osculation. At the present time, most commonly early in childhood and assuredly before the termination of the adolescent heterosexual urge, every normal individual comes in contact with a spirochetal infection and contracts it to a varying degree of severity. Following the initial reaction, we are safe in saying that as long as the gingival sulci exist, irrespectively of the common methods of treatment the spirochetes will persist, and that individual will have a gingivitis, either gross or microscopic, which will be potentially formidable in that it may flare into activity with explosive violence or progress in a chronic form to the destruction of the bony sockets and the loss of the teeth. From the day of its inception, the course of this disease will depend on individual resistance, local and general, and resistance to the nonspecific measures which are directed to its enhancement, particularly to the amount of vitamin C containing food that is ingested, to the therapeutic measures of combat and control, and to the fortuitous circumstances, such as intercurrent disease or trauma, which are superimposed upon it.

We believe that the best method of maintaining the gingivae in a state of health and in preventing postextraction infection is the ingestion of a high vitamin C containing diet, the periodic destruction of the mouth spirochetes by the use of a specific spirocheticide, the occasional mechanical cleansing of the oral cavity, the preoperative and postoperative use of a spirocheticide and the

careful instructing of the patient in the tenet that it is impossible to prevent disease in these areas by the use of the toothbrush unassisted.

For some years, we have been interested in the relationship which exists between specific gingivitis and a vitamin C containing dietary, and our observations lead us to conclude that the gingivitis associated with scurvy is specific in nature and that the gross pathologic reaction of the gingivae is caused by the activity of the fusospirochetal complex. Every case of scorbutic gingivitis is not pathognomonic of generalized scurvy; but, in the absence of a gingival reaction, we may be sure that scurvy does not exist. It is doubtful that these two processes are ever entirely dissociated, for they apparently have a binary etiology, a dietary deficiency associated with fusospirochetal activity. The pathologic gingival reaction in scorbutic gingivitis and in moderately active specific gingivitis, in which the scorbutic element is not obvious, is identical. In both are found a papillary edema, a hydropic degeneration of the endothelium lining the capillaries which may proceed to sclerosis, calcification and necrosis. It is difficult and perhaps unwise to conjecture as to the pathogenesis of this reaction, but it seems logical that the early vascular changes induced by the deficient diet sufficiently depress the local resistance, the main defense mechanism against this complex, to allow for a relative, if not an actual, increase in the virulence of the spirochetes. Clinical evidence is in favor of the correctness of this deduction; for we have found that an antiscorbutic diet is an invaluable prophylactic and therapeutic adjuvant in the prevention of gingivitis and in the treatment of the chronic conditions.

It has long been known among the dental fraternity that operative procedure in the presence of an acute gingivitis is contraindicated, and it has been equally well known that, occasionally, severe reactions followed manipulations where no gross sign of infection existed. The latter phenomenon has been the basis for considerable conjecture among the profession, but as far as we have been able to determine, dental literature contains neither a scientific nor a therapeutically applicable solution to this extremely important problem. The underlying mechanism of both reactions is the same: they represent an exacerbation in the progress of a fusospirochetal infection.

Since the pathology and symptomology of the various postextraction complications are so well described in the standard texts on this subject, we feel that their repetition is not indicated and will limit ourselves to the consideration of their etiology, prevention and treatment.

Primary dry socket not infrequently follows the extraction of a pulpless tooth, for the structures both within and around it are liable to have been infected, and if this had occurred, the local defense mechanism of the gingival and alveolar tissues would have been stimulated. The resultant sclerosis and eburnation not only limits the blood flow to that area, but also makes it difficult for the weak clot to make a sufficiently satisfactory lateral attachment to keep itself intact. The sphacelus and sequestrum at the depth of this ischemic cavity provide an anaerobic habitat ideally suited for the growth of the ubiquitous fusospirochetal organisms. The treatment of this condition should be primarily prophylactic; that is, before extraction, the operative area should be isolated by the use of cotton rolls and thoroughly saturated with a spirocheticide. The isolation should be continued until the surgical wound is completely filled with blood. If the operator allows contamination of the

open alveolus by fluids of the mouth, then bismuth should be applied directly within the tooth socket. We often meet a condition in which no hemorrhage takes place from the bony walls of the exposed alveolus. In this case, we advise removal of the eburnated bone with curets that have been dipped in a spirocheticide. This curettement should be extensive enough to break down the eburnated walls of the tooth socket and should be continued until the hemorrhage is sufficient to fill the surgical wound. Postoperative complications can be practically eliminated by strict adherence to surgical principles; that is, a minimum destruction of tissue, removal of débris and avoidance of deep contamination. The latter may best be accomplished by the use of a spirocheticide. The specific of choice is a 10 per cent glycerine solution of potassium bismuth tartrate. The treatment of an established infection is essentially the same as that for its prevention; namely, the application of the medicament directly within the socket.

Secondary dry socket not infrequently follows difficult extractions. It is caused by the clotting of the blood in the cavity wall prior to the completion of the operative procedure. In the search for an elusive root, the cavity may have to be wiped out several times, and thereafter insufficient blood may be shed to form a satisfactory residual clot. This tendency is no doubt increased by the use of epinephrine in the anesthetic. The prevention and treatment of this condition is essentially identical with that of primary dry socket.

POSTOPERATIVE PAIN

Generally, excessive pain following manipulation in the oral cavity is inflammatory in origin and is due to the activity of the fusospirochetal complex. The prevention and treatment are specific.

A sufficiently high percentage of all cases of cellulitis of the neck, jaw and sublingual regions, including Ludwig's angina, are caused, in whole or in part, by the activity of the fusospirochetal complex to justify, in addition to other treatment measures, the routine administration of the specifics. These infections are not rare; they may be quite serious, and they not infrequently result in death. They are the least understood and the most neglected of the complications. The literature is filled with reports of "rare" infections caused by weird organisms, and it is interesting to note that many of them were cured by the fortuitous administration of the specifics. There is little question that the case described by Hardgrove,[1] which he attributed to a monilia infection, was caused by fusospirochetal activity. The response to neoarsphenamine therapy is almost conclusive proof of that fact. It might be well for every reader interested in this subject to consult that article, for it demonstrates clearly the necessity for early diagnosis and immediate specific therapy. Cahn[2] similarly presents several cases which he attributed to the activity of an unnamed fungus and which healed rapidly on specific therapy; a response which should have suggested their probable etiology.

Since we have in previous articles discussed in detail the therapy of the spirochetoses, further repetition is not indicated.

Phagedenic gingivitis (noma, cancrum oris, gangrenous stomatitis) is an acute, penetrating fulminating infection which causes the rapid destruction and necrosis of the gingivae and contiguous structures

1. Hardgrove, T. A.: Infection with Monilia Following Extraction of Teeth, J.A.D.A., 20:483-487 (March) 1932.

2. Cahn, L. R.: D. Cosmos, 74:21-29 (Jan.) 1932.

and, if unchecked, the death of the host. This infection is generally precipitated by trauma and is characterized by the lack of resistance of the host, both local and general, and the rapidity with which the destruction advances. The jaw, cheek and other contiguous structures may be entirely destroyed. This condition generally occurs in debilitated children who have been on a diet deficient in vitamin C.

INFECTION IN CONTIGUOUS STRUCTURES

The organisms causing specific gingivitis may by direct extension or metastatic transference cause an infection almost anywhere in the body. The most common sites are in the immediately contiguous areas: nose, throat, sinuses, trachea, larynx, bronchi and lungs. Not infrequently, after mechanical manipulation in the oral cavity, one of these infections develop. The best treatment is prevention. If a case does develop, in addition to the surgical care, the specifics should be administered topically and parenterally. The possibility of such an infection following an extraction should always be held in mind, and the appearance of any untoward symptom, otherwise unexplained, within two weeks should be considered specific and treated accordingly.

PULMONARY ABSCESS

Pulmonary abscess is one of the rarer, but more severe, of the postextraction infections. It is particularly prone to follow operative procedures in the oral cavity performed under a general anesthetic. During extraction, material contaminated with fusospirochetal organisms may be aspirated into the lungs. Under an anesthetic, the gag reflex is inoperative, and aspiration is the rule; and from this, lung abscess frequently develops. Every patient desiring extraction under general anesthesia should be advised of this additional danger, and every case should be observed for some time after anesthesia. Any patient developing vague pulmonary symptoms or unexplained fever should be suspected of having a lung abscess until it is proved otherwise. The chest should be examined by the roentgen rays and the sputum examined for fusospirochetal organisms. If this condition is diagnosed in its incipiency, it may be aborted by two or three intravenous injections of neo-arsphenamine. This complication alone is sufficiently frequent and serious to justify the routine prophylactic use of a spirocheticide preoperatively.

CONCLUSIONS

Most dentulous individuals have chronic specific gingivitis. This is destructive *per se,* but is particularly dangerous in view of its potentialities for becoming activated.

The fusospirochetal complex is the most common cause of infections within or about the oral cavity.

The great field in the treatment of postextraction and associated infections lies in their prevention.

This is best accomplished by the preoperative and postoperative destruction of the fusospirochetal complex.

This may be accomplished by the use of the spirocheticides. Bismuth, in view of its high spirillicidal value and low toxicity, is the specific of choice.

TUMORS OF THE MOUTH, THE DENTIST'S RESPONSIBILITY*

By E. L. JONES, JR., D.D.S., Albany, N. Y.

THE cancer problem is one of the most acute facing the profession today. When we realize that cancer is second only to heart disease as a cause of death, the seriousness of the tumor problem at once impresses us with the need of further study and research and the cooperation of all branches of the healing profession.

Fortunately, the history of medical accomplishments supplies us with courage and hope; for it was only a comparatively short time ago that tuberculosis occupied this same position. By diligent research and by education, it has been forced downward from third place on the mortality lists to fifteenth.

What has been accomplished in the case of tuberculosis can and will be accomplished in the fight against cancer if we all recognize our responsibility or our place in the group whose responsibility it is to combat this disease. Notwithstanding widespread opinion to the contrary, cancer is to a considerable extent at present a curable disease.

It is the dentist's obligation, responsibility and duty to recognize and diagnose mouth neoplasms. Whether we accept this responsibility it is for us to decide, but others are waiting to take our places, to step in and assume that which is admittedly our bounden duty. The treatment of this disease is, of course, another matter. We do not have to accept responsibility for this phase of cancer work unless we feel qualified to continue the case to a successful conclusion. In the matter of diagnosis, there seems to me to be no choice: we must accept the responsibility. We are the first members of the healing profession to examine the oral cavity and thus to see these neoplasms in their infancy.

We know that in combating cancer of the mouth, early treatment, whether surgical or by the roentgen rays, radium or heat, must be instituted, and to carry out treatment intelligently, it is necessary to diagnose the condition and classify the tumor positively. It is for this reason that we as dentists are almost indispensable to this first line attack on cancer to reduce its mortality and push it farther down the list. Our work is therefore laid out for us and there is no alternative but to accept the responsibility.

We must school ourselves to look with suspicion on any growth in the oral cavity that does not yield promptly to palliative treatment.

Can we do anything to help prevent cancer? I believe that we can. There is no cavity in the human body that is subjected to the traumatism and abuse that the oral cavity is. One of the accepted etiologic factors in cancer is chronic or continued irritation. How much of this could be avoided if we constructed prosthetic substitutes on a biologic basis in-

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*Read before the Third and Fourth District Dental Societies and the Adirondack Dental Society, Saranac, N. Y., Oct. 8, 1932.

stead of a mechanical basis? The jaws are continually being insulted and traumatized by ill-fitting bridges, fillings, plates, etc., to say nothing of the thirty-two avenues of infection to the upper and lower jaw offered by the teeth; and no tissue in the human body has such a delicate first line defense as the gingival margin. Aside from the traumatism exerted by biologically unsound prosthetic appliances, think of the irritation from drugs, food, smoking, infections, fermentation, etc., and then consider how much of all this I can, as a dentist, prevent. The gravity of our position in this problem becomes evident.

Early diagnosis is often the only hope we have of combating death in our fight to control cancer; and, in cancer of the mouth, that duty is purely the dentist's. It is our obligation to recognize these tumors and either institute therapy at once or refer the case to one who is qualified to handle it. If we elect to treat the

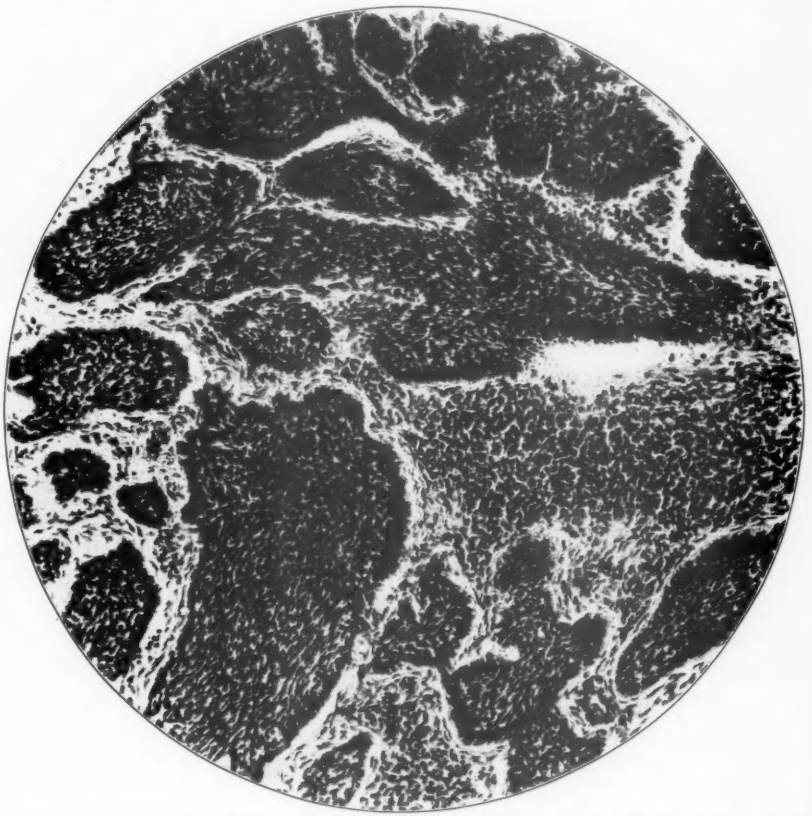

Fig. 1.—Basal-cell epithelioma. There are a large number of nuclei, with a small amount of cell substance. This type of tumor will respond to radium or roentgen-ray therapy.

condition, we must have confidence in our ability to handle the case as successfully as is possible, to the termination of the disease, whether it be death or cure; for treatment of tumors of the mouth is a serious undertaking.

point: cancer in its early stages is as a rule painless. The patient has a neoplasm and is not aware of it. With pain, the prognosis usually becomes unfavorable.

Tumors of the mouth, anatomically, are divided into two classes or groups:

Fig. 2.—Mycosis fungoides.

There is no doubt about the dentist's responsibility for early recognition of mouth cancer. I am sure that we all accept it. The dentist sees and examines more mouths in a week than a physician sees in a month. Remember this one

those of the hard tissues or bone, and those of the soft tissue. These are further subdivided into benign and malignant. Malignancy is described as meaning rapid growth, invasion of surrounding tissues, tendency to recur after operation and

tendency to ulceration. There is also a profound disturbance in the general nutrition of the body, emaciation or cachexia, and metastasis. Involvement of the neighboring lymph nodes generally takes place.

Fig. 3.—Basal-cell epithelioma.

Benign tumors do not have these characteristics. They grow locally and are an annoyance only because of the local inconvenience they may cause. Benign tumors of the soft tissues are: papilloma, adenoma, fibroma, myxoma, lipoma, neuroma, myoma, hemangioma, lymphangioma, giant cell tumor, certain types of mixed cell tumors of the salivary glands and certain types of teratoma.

The benign tumors of the hard tissues or bone are: osteoma, giant cell tumor, fibroma, myxoma, odontoma, admantinoma, lipoma, chondroma and certain types of teratoma.

The malignant types of the soft tissues of the mouth are: sarcoma, certain types of mixed cell tumors, endothelioma, carcinoma and teratoma.

The malignant tumors of hard tissues

or bone are: sarcoma, certain types of mixed cell tumors, carcinoma (by extension metastasis) and certain types of teratoma.

It will be seen from the foregoing list that the greater number of growths seen in the mouth are in the benign column, but we must not lose sight of the fact that all benign tumors are potentially malignant and must be dealt with scientifically and thoroughly. While tumors on the basis of histology may be classified somewhat differently, the list given will help us to understand more clearly the pathologic and other classifications.

One of the most popular classifications at the present time is based on the reaction of the tumor to radium or the roentgen rays; i.e., as radio-active tumors and radioresistant tumors.

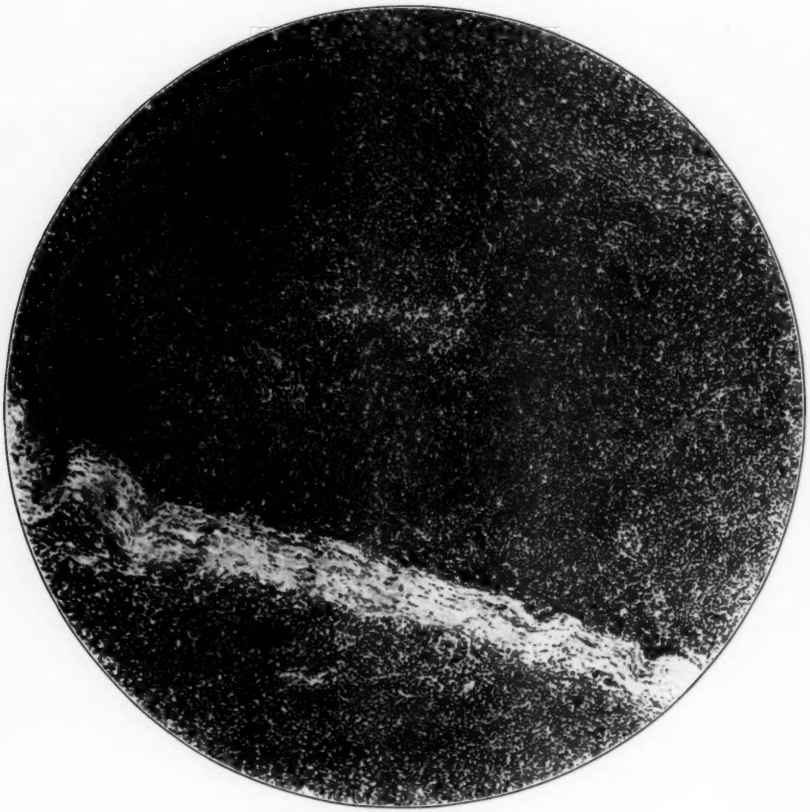

Fig. 4.—Lymphosarcoma.

The tumors that fall in the radio-active group are those that respond well to treatment by radium or the roentgen rays. In this type or class, the nuclei pre-

dominate over the cell substance and are deep staining; and the tumor is well supplied with capillary blood vessels.

The accompanying photomicrographs of tumors that respond well to this treatment will illustrate the point more clearly.

Here also, the nuclei predominate over the cell substance.

Figure 3 is a photomicrograph of a basal-cell epithelioma. Here, the capillary blood vessels and great numbers of nuclei have matured.

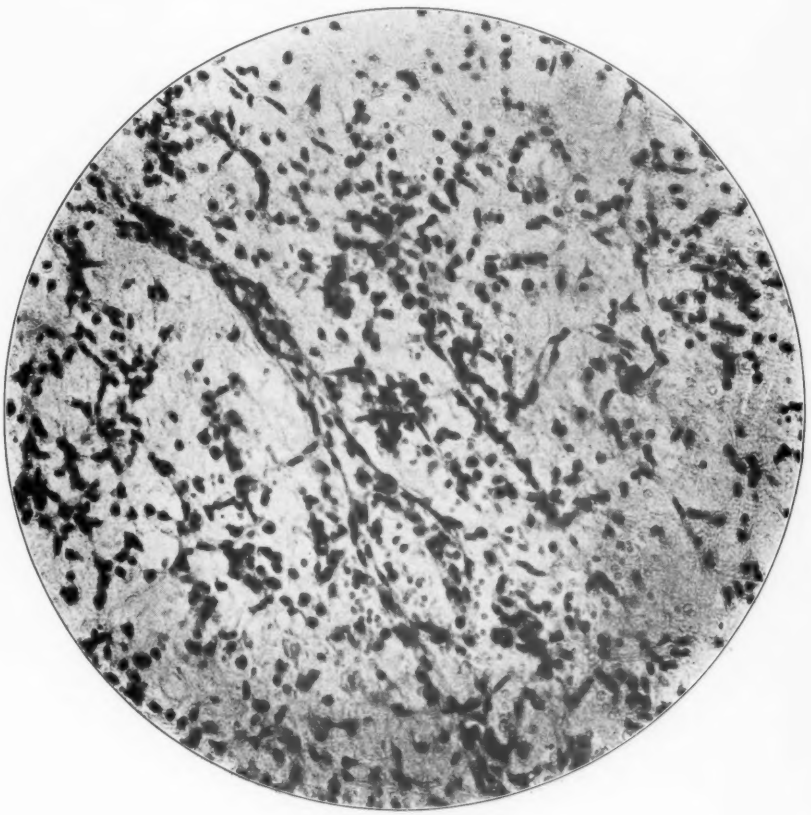

Fig. 5.—Fibrosarcoma.

Figure 1 is a photomicrograph of a basal-cell epithelioma. There are a large number of deep staining nuclei and little cell substance.

Figure 2 is a photomicrograph of tissue from a case of mycosis fungoides.

Figure 4 is a photomicrograph of lymphosarcoma, almost entirely nuclei. Little cell substance is visible.

Figure 5 is a photomicrograph of a fibrosarcoma.

As I said, all these tumors respond

well to radio-active therapy because the nuclei predominate. Also, this type of tumor is slower growing and less malignant than the resistant type.

In the radioresistant type of tumor, we find the cell substance predominating.

Fig. 6.—Adenocarcinoma.

Figure 6 is a photomicrograph of an adenocarcinoma. The preponderance of cell substance is evident.

Figure 7 shows a squamous cell epithelioma, as does Figure 8 also.

This type of tumor is more malignant than the radioactive, metastasizes faster and, in general, runs a much faster course.

This classification of tumors may be, and by some authorities is, subdivided into various types and under degrees of radiosensitivity, etc., but for a basis on which to build a further understanding of tumors and modern methods of treatment the simple two type classification will be easier to keep in mind and answers the purpose just as well.

The most common tumor we see in the

mouth is the granuloma, a tumor composed of granulation tissue. This type is benign and is usually simple to handle, but like all tumors, it is a potential source of a great deal of trouble, demanding the greatest care in handling, as I will demonstrate.

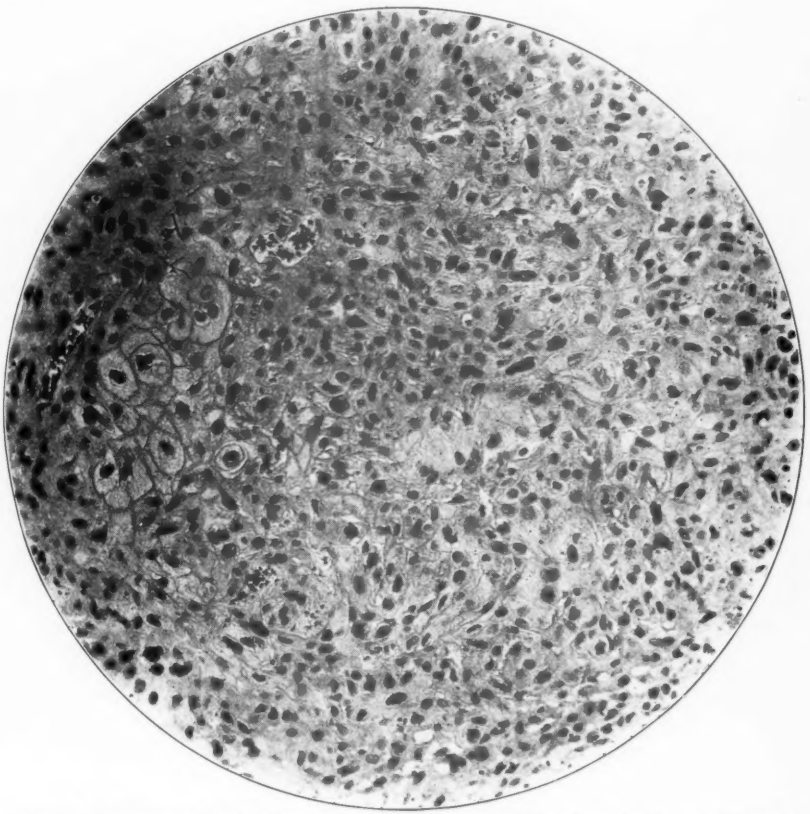

Fig. 7.—Squamous-cell epithelioma. There are a small number of not deeply staining nuclei, with a large amount of cell substance. This type of tumor does not respond well to roentgen-ray or radium therapy.

Next in order of frequency of occurrence, we have the cysts, classified into two groups: those of the soft tissue, which are mucous cysts, such as ranula, dermoid cysts and cysts of the salivary glands. Those of the hard tissues are radicular cysts, such as root cysts, dental cysts, periodontal cysts, cysts of the maxillary sinus, follicular cysts or dentigerous cysts and cystic adamantinoma or multilocular cysts.

Of the cysts, the most interesting perhaps is the ranula, which occurs under the mucosa and is caused by the plugging, or obstruction, and dilation of a salivary

or mucous gland. The ranula is a benign growth as far as destruction of tissue is concerned, but has malignant characteristics in its ability to recur unless completely eradicated. Of course, this recurrence is truly benign, but the persistence in recurrence is most annoying. It is easily eradicated by complete removal of the cystic membrane and correction of the cause even to the extent of supplying artificial ducts by the use of silver wires placed through the cystic cavity.

In the anatomic consideration of tumors, there is a term which I believe that it is well to clear up, the term "epulis." Gould defines it as a small elastic tumor of the gums, a giant cell sarcoma of the jaw. Mead says, "Epulis is a topographic term," as any tumor occurring on the gum is an epulis. Scudder states that an epulis is a border-like tumor midway between inflammation on the one hand and a neoplasm on the other. Dunning divides epulides into malignant and nonmalig-

Fig. 8.—Squamous-cell epithelioma.

nant, citing as differences the following definite points: The nonmalignant type does not loosen teeth; the malignant type does. The nonmalignant type does not bleed easily, while the malignant type bleeds very easily. "Epulis" is a rather confusing term, meaning, literally, any tumor on the gums. Such growths do not originate from this tissue, but rather from the periosteum of the underlying bone, usually at the border of the dentoalveolar process. They occur in younger people, and they are the most frequently seen of all oral tumors. No doubt this is due to the fact that all mouth tumors are called epulides until definitely classified by the pathologist. Ivy states that the fibroma is the most prevalent form of epulis. Other authors claim that the giant-cell type predominates. Nevertheless, all agree that all tumors of the gum are epulides until farther classified. If we accept Ivy's definition of epulis, we may include under this term such growths as odontoma, parotid tumors, chondroma, hypertropic osteitis, sarcoma, round or spindle cell, melanoma, epithelioma and adamantinoma. So it is readily seen that it is best to consider the term "epulis" merely as a general term meaning any growth on the upper or lower jaw, until such a time as the pathologist can classify it.

Another term used in describing mouth lesions is "neoplasm." This term has significance, in contrast to the term "epulis." It is defined as marked growth, characterized by a tendency to persist or increase in size, independently of changes in the metabolism of contiguous or systemic structures and performing no useful function. It is also described as being a circumscribed enlargement of a part due to the presence of a morbid growth.

Anatomically, cancer of the mouth presents a picture somewhat different from that of cancer of other parts of the body. Tumors of malignant type of other parts and organs seem to metastasize early and quite extensively. For example, a cancer of the prostate quite commonly produces metastatic or secondary tumors of the mandible. Tumors of the mouth rarely form remote or secondary cancers except in the terminal stages. Also, it might be noticed that tumors of the mouth and jaws rarely extend beyond the clavicle. Another anatomic peculiarity of tumors of the mouth is the fact that if the tumor is situated on one side of the median line of the head, it will only involve the glands on the same side. Cross metastasis does occasionally occur, but this is not the rule.

Although mouth tumors do not metastasize except in the last stages, they do involve the glands of the particular region in which they are situated. The glands involved are the submental, submaxillary, tonsillar, those beneath the upper end of the sternomastoid muscle and those of the posterior triangle. I am speaking now of primary growths, stressing the point that these growths rarely set up new growths in other parts of the body. We do find growths in the mouth, particularly in the mandible and maxilla, that are not primary but metastatic.

Let us now look at tumors clinically. First, let us understand that the management of tumors is not a one-man undertaking. A pathologist is the most important member of the group; for, in some cases, it would be almost impossible to arrive at a diagnosis and classification and to institute therapy without his help. Of course, we may examine a neoplasm and arrive at a diagnosis, and, in some cases, guess right; but this does not happen often, and when diagnosis has been wrong and treatment instituted, the results are disastrous. In addition to the pathologist and surgeon, the group should have a roentgenologist, for some of these malignant growths are radiosensitive, and

therefore better treated by radium or the roentgen rays than by surgical measures. It is group attack or team work that will afford results, a team composed of a pathologist, a radiologist and a surgeon as well as a dentist. With a team of this type working in close harmony, cases that need both surgical measures and irradiation get it without delay, and the wisdom of these minds working together and trained in different specialties assures a given result and will succeed in a larger percentage of cases than when a case is attacked by an individual.

Cooperation is the clinical foundation on which successful cancer therapy is built.

In the clinical aspect of the condition, we have two terms which are somewhat confusing to one not actively engaged in dealing with cancer cases. They are "sarcoma" and "carcinoma." Of course, we know that sarcoma is the mesoblastic or connective tissue type and that carcinoma of the mouth is the hypoblastic or epithelic tissue type. What we are interested in primarily is the clinical difference between the two terms. Briefly, it is as follows: The growth in sarcoma is not invariably continuous. It is likely to be interrupted. In carcinoma, it is rapid and continuous. Secondary changes in sarcoma are chondroid, osseous and calcific, and pigmentary changes are frequent. In carcinoma, secondary changes are rare. The site of sarcoma is primarily in deep structures, always from connective tissue; while carcinoma is epithelial in origin, usually starting superficially. As for a capsule sarcoma, we find the pseudo-encapsulated type primarily. Later, it infiltrates the surrounding tissue. Carcinoma is never encapsulated. Sarcoma occurs most frequently before middle life. Carcinoma occurs most frequently after middle life. Sarcoma not uncommonly follows injury or trauma; in carcinoma there is rarely a history of trauma, but there may have been prolonged irritation. This is especially true of the superficial forms. Carcinoma appears more often in the upper and lower jaws than sarcoma (ratio 3:2) and occurs more frequently in men than in women. Carcinoma begins primarily in the mucous membrane, never in bone. Sarcoma may start in bone.

Clinically, in certain types of cases, the degree of malignancy can often be recognized. The papillary cancer, seen more often on the alveolar process and arising in a patch of leukoplakia of long standing, is of low malignancy; while the nodular ulcerated type, seen more commonly on the tongue or floor of the mouth, is usually of high malignancy. The rapidity with which the glands become involved also varies with the situation.

The infectious diseases of the mouth, such as syphilis, tuberculosis, Vincent's infection, agranulocytic angina and actinomycosis, are most interesting because of their relationship to cancer.

Syphilis, for example, has the characteristics of almost every disease known, especially tumor. For this reason, a Wassermann examination is absolutely necessary as the first step in the diagnosis of any mouth lesion. With this examination, a history as complete as possible should be taken, for the data thereby obtained give us a definite idea as to the prognosis.

Second to syphilis is leukoplakia; and it is even more important than syphilis because it is very definitely a precancerous lesion. It must be positively identified and differentiated from syphilis, Vincent's infection, agranulocytosis, actinomycosis and tuberculosis. The differential diagnosis is accomplished by the use of the Wassermann test, culture, smear and blood count. It is quite evident that these infectious lesions which are fre-

quently found in the mouth should be accurately diagnosed before treatment of any kind is instituted. A mistaken diagnosis is bound to produce unsatisfactory results.

SUMMARY

The clinical consideration of mouth tumors can be briefly divided into:

1. History.

2. Differential diagnosis and careful consideration of infectious diseases of the mouth such as: (*a*) ulcerative tuberculosis, diagnosed by smear; (*b*) tuberculoma, diagnosed by section or biopsy; (*c*) Vincent's infection diagnosed by smear; (*d*) agranulocytosis, diagnosed by blood count; (*e*) actinomycosis, diagnosed by smear.

All of these diseases are often mistaken for cancer.

3. Wassermann examination. This is routine, always being made immediately after the history has been completed.

4. Roentgen-ray examination. This is extremely important in the diagnosis of any lesion of the upper or lower jaw.

5. Biopsy. A section is taken in every tumor growth. It is extremely important as it would be rather difficult to arrive at a diagnosis without it.

6. Treatment. From the foregoing data, the method of attack is determined.

I should like to sound a word of warning against the use of surgical procedures of any type or character on the upper or lower jaw for any patient who has been subjected to roentgen-ray or radium treatment. These patients have a very definite tendency towards osteomyelitis after such operations.

CONCLUSION

1. Cancer is to a great extent a curable disease.

2. Cancer of the mouth is a preventable disease, and it is the duty of the dentist to eradicate it from the list of fatal diseases by educating the laity and by practicing cancer prevention.

3. It is the dentist who first sees the patient in these cases.

4. The dentist should immediately decide whether to diagnose and treat the patient or send him to a group who are adequately equipped and qualified to handle the case.

5. Cancer therapy is not to be attempted by one man. It is group attack that succeeds in these cases.

6. A group should be composed of a pathologist, radiologist, surgeon and dentist.

7. The infectious diseases of the mouth should be diagnosed differentially as they are often mistaken for cancer.

8. The routine in handling cancer patients should be: history, Wassermann test, roentgen-ray examination, biopsy, taking of smears, cultures and blood count, diagnosis and treatment.

75 State Street.

THE COUNCIL ON DENTAL THERAPEUTICS*

By ARNO B. LUCKHARDT, Ph.D., M.D., LL.D., Chicago, Ill.

CONSCIOUS of the limited time at my disposal, I propose to dwell briefly on certain features of organization and my own personal reflections on the accomplishments of the Council on Dental Therapeutics, on impediments to its activities and on the outlook, should the Council be allowed to exist. It should be understood, therefore, that I speak not for the Council but quite individually as a member of it.

PERSONNEL AND AIMS

In most general terms, the aim of the Council is best expressed by its motto: "We Serve Not for Ourselves but for Dentistry" and the public.

A similar motto, unexpressed but implied, has motivated the Council on Pharmacy and Chemistry of the American Medical Association in its evaluation of the medicinal products and therapeutic claims of products submitted to it for the past quarter of a century. No one except the exploiter of dubious preparations will contest the assertion that the medical profession and the public have benefited by its decisions. It was, therefore, appropriate that the Council on Dental Therapeutics model its official rules on the general structure of the Council on Pharmacy and Chemistry of the sister profession. To be sure, our dental council was twenty-five years late in getting under way; but the twenty-five years of experience of the Council on Pharmacy and Chemistry was also an inestimable heritage which allowed us to enter promptly and vigorously into the work expected of us.

The present members of the Council are:

Clinical members:

Thomas J. Hill, D.D.S., professor of clinical oral pathology and therapeutics, Western Reserve University, School of Dentistry, Cleveland, Ohio.

Percy R. Howe, Sc. D., D.D.S., director of Forsyth Dental Infirmary for Children, Boston, Mass.

Charles N. Johnson, D.D.S., LL.D., Editor of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION, Chicago, Ill., ex-officio.

John A. Marshall, Ph.D., D.D.S., professor of dental pathology and biochemistry, University of California, College of Dentistry, San Francisco, Calif.

Harry B. Pinney, D.D.S., Secretary, American Dental Association, Chicago, Ill.; ex-officio.

U. Garfield Rickert, A.M., D.D.S., professor of materia medica and therapeutics and hygiene, University of Michigan School of Dentistry, Ann Arbor, Mich.

Harold S. Smith, D.D.S., chairman of the Council, and practitioner of dentistry, Chicago, Ill.

Basic science members:

J. Howard Brown, Ph.D., Sc.D., associate professor of bacteriology, Johns Hopkins University, Baltimore, Md.

*Read at the annual meeting of the International Association for Dental Research, Chicago, Ill., March 18, 1934.

Paul J. Hanzlik, M.D., vice-chairman of the Council, professor of pharmacology, Stanford University School of Medicine, San Francisco, Calif.

Milan A. Logan, Ph.D., instructor in biologic chemistry, Harvard Medical School, Boston, Mass.

Arno B. Luckhardt, M.D., Ph.D., LL.D., professor of physiology, University of Chicago, Chicago, Ill.

Victor C. Myers, Ph.D., Sc.D., professor of biochemistry, Western Reserve University Schools of Medicine and Dentistry, Cleveland, Ohio.

Samuel M. Gordon, Ph.D., chemist and secretary of the Council; chief, A.D.A. Bureau of Chemistry, Chicago, Ill.

In general, then, the Council has a total membership of thirteen. Of these, six are active in the practice and teaching of dentistry; six are active in the research and teaching of the various sciences basic to medicine and dentistry. The secretary, Dr. Gordon, is the only member who receives a salary. C. N. Johnson, as editor of THE JOURNAL and Harry B. Pinney, Secretary of the American Dental Association, are ex-officio members of the Council.

The *modus operandi* of the Council is based on its official rules, contained in a booklet of thirty-four pages. When a firm or manufacturer submits a product for consideration and for the seal of acceptability by the Council, the submitted product is evaluated on the basis of its alleged merits and according to the rules. The data are submitted by mail to the individual members by the secretary and in the form of mimeographed sheets which constitute the bulletin of the Council. The Secretary acts as the collector and distributor of the material, and, in a sense, as parliamentarian for the Council. The vote is individual and secret except that the collective vote is published in a subsequent issue of the bulletin.

Special matters are submitted to an anonymous referee. The report issued by the referee is submitted to the Council through its bulletin for approval, modification or correction.

In proper form, the verdict on a product, or the report of the referee, approved by the Council, is submitted to the Editor of THE JOURNAL for publication.

These technical procedures have been dealt with not only in previous publications by the secretary and various members of the Council but also in the official rules, which may be had for the asking.

May I, therefore, be privileged to summarize the present status of the Council as I personally look at it.

ACCOMPLISHMENTS

Whether destructive criticism can ever be considered an accomplishment, I will leave for you to decide. At any rate, the Council decided at its outset to attack vigorously the "dentifrice racket." It realized that it had more important work to do; but concluded that something ought to be done to warn and protect the profession and the public against the misleading, if not downright untruthful, advertising of some unscrupulous copymen and manufacturers. In principle, the Council agreed that:

Dentifrices (with special reference to those advertised to the public) may be accepted for inclusion in the list of Accepted Dental Remedies provided: claims are strictly limited to their efficacy as an aid in the hygiene of the oral cavity and particularly to their mechanical cleansing properties; provided no therapeutic, chemical or bacteriologic claims are made or inferred in their exploitations; provided therapeutically suggestive names are not used as a brand name; provided the brand name is not indicative of a component which does not possess proven therapeutic properties or other inferred properties implied in the name, and there is no conflict with the rules

of the Council. The provisions in reference to proprietary names will not be retroactive.

Every thinking dentist will agree with each and every one of these provisions; for the nauseous and fraudulent claims made for many dentifrices in the supposed cure of pyorrhea, Vincent's infection, trench mouth, etc., must have incensed the profession as a whole these many years. Manufacturers of such dentifrices as Alpha-Naph-Co Dental Cream, Colgate's Dental Cream, Dentosal, Detroit Dental Aid Commission Tooth Powder, Ephraim Dental Cream, Hennen's Tooth Powder, Iodent Tooth Paste No. 1 and No. 2, Lactona, Naboc Tooth Powder, Parke-Davis Dental Cream, Plough's Tooth Paste, Pycopé Tooth Powder, Arm & Hammer Brand of Sodium Bicarbonate, Ward's Tooth Paste, Zanol Tooth Paste and Dentaline Tooth Powder conformed to the rules in the interests of scientific accuracy and, no doubt, to their immediate financial loss. The, let us say, nonconformists are reaping, perhaps, the immediate and sordid benefits of exploitation. This must be irksome for the former, who, after all, are also in business —particularly in these days of general depression. That is why I take great pleasure in mentioning the names and the products of those who at a probable financial loss to themselves decided to advertise ethically and receive only for the present the seal of acceptability from the Council on Dental Therapeutics of the American Dental Association.

Products other than dentifrices have been examined. Some were passed on favorably. May I condense some data compiled as of March 7, 1933. Eighty-five products were announced in THE JOURNAL as acceptable. But I would have you note that ninety-five products besides the eighty-eight officially announced as nonacceptable were not, for some reason or other, condemned officially, although the reports were promptly submitted. Furthermore, the Bureau of Chemistry examined forty products. The reports on them have, as yet, not been published. Inquiries on about 700 products have received appropriate and personal attention. The list of 1,111 products considered by the Council does not include a great number of preparations which have been passed on by the Council on its own initiative. Others were rejected, partly because the claims made for them were scientifically and clinically unjustifiable and partly because many of them were sold at an exorbitant price to the profession and public. For example, one product sold to the profession of dentistry at $10 for two-thirds fluid ounce was found by the Bureau of Chemistry of the American Dental Association to consist of 41 per cent sulphuric acid, worth less than 1 cent. Four fluid ounces of another well-known preparation, and selling for $1.50, could be prepared by any dentist for a few cents. Again, the government agreed with the Council that a pyorrhea cure consisting of ordinary table salt is quite fraudulent, as well as expensive, at $1 for 2 ounces. Finally, $72 is quite too steep a price to pay for something which can be procured easily for 50 cents.

The Council's practical weakness in these matters lies in the fact that neither the public nor the profession are forcefully and persistently apprised of its decisions. We shall return to this aspect a little later.

However, constructive work in the interest of the profession has not been neglected. I refer particularly to the completion of the list of "Accepted Dental Remedies" now appearing serially in the issues of THE JOURNAL. After appearance in THE JOURNAL, it will be issued in book form and will contain, as originally

planned, "a description of proprietary articles which have been accepted as conforming to the rules of the Council; of such simple nonproprietary and nonofficial substances as seem to be of sufficient importance to warrant their inclusion, and of simple pharmaceutic preparations, the inclusion of which is believed to give useful information to dentists."

Shortly after its formation, attempts were made to have the Council pass favorably on products for inclusion in "Accepted Dental Remedies" whose value was dubious or for which only remote talking points could be made. In several of such instances, investigative work was done entailing time and expense. This research is the silent contribution of some universities which furnished the men, material and money in the interest of the cause. Having "called" the manufacturers by experimental work and not opinion only, the Council and its decisions have apparently acquired the respect of certain manufacturers. Unfortunately, the Council is in no position financially to do more of this kind of work.

IMPEDIMENTS

The Council having been called into existence through action of the Trustees of the American Dental Association, it seemed reasonable to assume that the profession (officials and other members) would organize in support of this defense of its own making against fraud and imposition. As a matter of fact, many of the editors of the journals of organized dentistry were, and still are, either lukewarm or passive in the matter. One editor in particular has been, on occasion, even actively hostile. Little wonder then that the profession as a whole is ignorant of the work of the Council or indifferent to its activities. Not only that: One suspects at times even a subtle and inimical opposition of some of the officers in power. Obviously, one cannot expect the trade journals to rush to the support of the work of the Council by a succession of editorials in its behalf, when they accept lucrative advertising copy on products declared unacceptable by the Council. In fact, the work of the Council in behalf of truth and scientific accuracy was at one time almost nullified by the appointment of a secret super-Council designed to pass on the reports of the Council prior to publication. I hasten to add that this super-Council was soon dissolved.

THE OUTLOOK

To conserve time, I will merely enumerate what the Council hopes for, namely:

1. Ample financial support of the Council and the Bureau of Chemistry in order to protect the profession against the detail man with his multitudinous dental panaceas.

2. Refusal of organized dentistry to:

(*a*) Permit advertising of products in the pages of its journals except such as are approved by the Council on Dental Therapeutics. If the verdict is unfavorable, advertising matter of the product should be deleted promptly from the journals. Even in these hard times, one is not justified in selling out the profession and the public for a mess of pottage.

(*b*) Permit sale of floor space of unacceptable products at official meetings and conventions. If this does not seem practical or worth while, it were high time to abolish the Council in the interest of plain logic and consistency; for the perpetuation of the Council in the face of untruthful and extravagant advertising at dental conventions of products declared unacceptable is an overt expression of lack of confidence in the scientific and clinical judgment of the Council mem-

bers. It means either that the present Council is not worthy of support, or that organized dentistry is not ready for, or does not want, a watch dog to guard its scientific interests.

3. An active editorial support in its behalf.

THE SOLACE

In presenting you with my point of view of the Council I have been frank, perhaps unwisely frank. Attribute it, if you will, to lack of time to gloss over nonessentials or to my temperamental inability to beat around the bush with ambiguous and mellifluous statements at any time, but particularly when an issue of vital importance is at stake. My belief in the cause is so real that I am not only willing but also feel privileged to labor and fight for it. The enthusiastic response by many of the profession encourages me in the belief that the Council is beginning, in spite of handicaps, to come into its own, and that the voluntary task and altruistic services of its members are being appreciated.

May I at this point be allowed to read but one statement from one of the profession:

> There is on the market under various trade names, a surgical cement. It is a good and useful preparation too and I got in the habit of using it for a lot of things such as a temporary stopping and a protective dressing after extractions. It costs I believe $3.00 for a small package. I went down to the wholesale drug house, bought 25 cents worth of rosin and the same of zinc oxide and ground them together in a large mortar. This made an inlay-investment canfull. I have been using from that lot for two years and have enough left to last me five more. It's better than any I ever bought because I added some ground asbestos which I happened to have on hand and made a more tenacious mass. Eugenol and olive oil, equal parts is used as the liquid.

Please note that, through the offices of the Council, this practitioner was able to make his own seven year supply of cement for 50 cents. Before this, he paid $3 for a "small package."

The Council furthermore appreciates the fact that in a recent quest for bids on dentifrices issued by certain purchasing agents of the U. S. government, it was definitely stated that only such products as were declared acceptable by the Council on Dental Therapeutics would be considered. It may interest you also to know that thirty out of thirty-seven deans of dental schools in this country stated that purchase of the book "Accepted Dental Remedies," compiled by the Council, would be either required of or recommended to its dental students. Seven deans have so far not answered the recent questionnaire.

These are encouraging signs. The sooner the editors of the various journals of organized dentistry actively support the work of the Council, the sooner will come the day when exploiters and manufacturing quack-salvers will be routed from the dental camp in the interest of both the profession and the public. Incidentally, advertising space will then not only be sought for, but also sought for at a handsome premium.

5216 Greenwood Avenue.

PRACTICAL ROENTGENOGRAPHY IN THE DIAGNOSIS OF MALOCCLUSION*

By LELAND R. JOHNSON, M.S.D., D.D.S., Chicago, Ill.

THIRTY-EIGHT years have passed since Röntgen, in 1895, accidentally laid an energized Crookes tube on a book containing a flat key used for a bookmark. Under the book was a plate holder containing an unexposed photographic plate, which, when developed after being exposed in outdoor photography, showed the shadow of a key, which Röntgen recognized but could not account for. He recalled the incident of placing the tube on the book and tried it again, obtaining the same result. He then placed his hand over an enclosed photographic plate, placed the energized tube near his hand and made a picture of the bones, the first roentgenogram of living tissue.

Since that time, the roentgen rays have been developed greatly, and no doubt there are many yet undreamed of possibilities to be discovered in this field. The fact remains that the roentgen rays are not generally utilized to the fullest extent of their present-day possibilities in the diagnosis of malocclusion. In 1928, it was estimated that only 40 per cent of the entire dental profession used roentgen rays at all. It is the object of this paper to present the different types of roentgenograms available as diagnostic aids in the diagnosis of malocclusion.

The interpretation of a roentgenogram presupposes a thorough knowledge of the normal appearance of the gross anatomic structure of the region roentgenographed so that any departure from normal, due to congenital defects, accidents or pathologic change, if present, may be recognized.

A definite routine should be followed in the examination of a dental roentgenogram or full mouth roentgen ray films. It matters not what routine is followed, and this naturally varies with different persons, provided the same systematic approach is used each time. For instance, we should first account for all permanent and deciduous teeth. Secondly, we should consider the crowns: Do they have normal occlusal lines? Do they have deposits in the interproximal spaces? Are they in contact, and are the restorations in good condition? Next, we should examine the cervix, then the pulp chambers and root canals, the peridental membrane, the root outline of both deciduous and permanent teeth, the alveolar process, etc.

Figure 1 shows full mouth roentgenograms of a patient needing orthodontic treatment. A casual observation reveals an apparently normally developing denture. Closer observation shows a slight discrepancy of the lower right second bicuspid and the upper right first bicuspid. Still, one might feel that this would not cause a great deal of trouble. But second guesses are always better, and Figure 2 shows the teeth, which in due course of time erupted. An anomalous

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 11, 1933.

tooth in each instance complicated the treatment of this case to a great extent. The old adage "believe nothing that you hear and only half of that you see" seems to apply very well in this instance. Knowing of these anomalies in advance would influence the length and plan of treatment to be followed.

The beginning of orthodontic treatment in most cases of malocclusion necessitates an estimate of length of treatment. This demands an intelligent diagnosis, which, in turn, requires a thorough roentgen-ray examination. The use of the roentgenogram in orthodontic diagnosis is most important. A complete diagnosis of any condition cannot be made from films alone, but when combined with clinical examinations and case histories, roentgenograms are indispensable, revealing many things of vital importance to the case in question.

A routine procedure should be followed in the examination of every case. Naturally, every roentgen-ray examination will not show a pathologic or abnormal condition, and, after all, the normal condition is that which we wish to find. The roentgenogram that excludes the abnormal condition is as valuable as the one that discovers such a condition.

Many cases of malocclusion are treated with no more roentgenographic information than that given by full mouth films and some of these are very inferior. Figure 3 is such a film. Attempted interpretation of an inferior roentgenogram is a mistake, and the reason many of these mistakes are unnoticed is that no abnormality was present. To overlook the abnormality because of a poorly made film is inexcusable. A roentgenogram of that kind is almost as worthless as no roentgenogram.

The full mouth roentgenogram is certainly not adequate in many cases. (Fig. 4.) This one shows everything apparently normal except a small dark area below the lower incisors, which might be missed unless the film were carefully examined.

Further examination revealed a cyst involving the lower right central and lateral incisors and lower right cuspid. Added views of this case had to be taken to reveal the true condition. I have seen many full mouth examinations which would not have included this cyst at all.

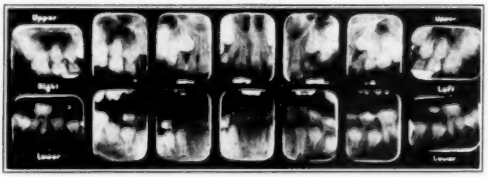

Fig. 1.—Full mouth roentgenograms, casual observation of which suggests apparent normal development.

This brings up the question as to the minimum requirements of a radiodontic examination which is adequate and essential in the diagnosis of malocclusion. In my opinion, the minimum requirements consist of a fourteen view intra-oral examination (Fig. 5) which includes one view of the incisors, one of each cuspid region, one of each bicuspid region and one of each molar region in each jaw. This will give seven views of each jaw and the duplication of the images of the teeth on the films gives several different views of the same tooth.

Occasionally, even with a fourteen-film examination, it is necessary to make an extra roentgenogram of some area which was not clearly revealed in the full-mouth examination. (Fig. 6.) In the case of patients under 10 years of age, a ten-view examination is in many instances adequate.

To complete requirements extra-oral views of the right and left side should be made. (Fig. 7.) These views are more general in character and give one a more definite idea of the relative positions of the erupted and unerupted teeth. In some instances, disease or anomalies may

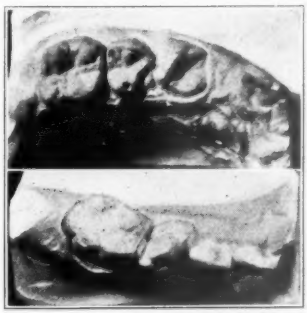

Fig. 2.—Case shown in Figure 1. The presence of the anomalous upper right first and lower right second bicuspids was not suspected until they erupted.

be revealed which may not have been included in the full-mouth examination.

As a general rule, the examination as just described will furnish all the information necessary in the diagnosis of malocclusion. There are cases in which it is desirable to have an accurate record of either the presence or the absence of interproximal decay. In those cases, a bite-wing interproximal examination should be made. (Fig. 8.) The bite-wing examination gives an undistorted shadow of that area. It is significant that the bite-wing film shows caries very clearly.

In addition to those made in the routine examination, special types of roentgenograms are indicated in many cases, whenever additional information can be made available. Any film can be considered only as a diagnostic aid and each added bit of information becomes valuable in the diagnosis of any condition.

The profile roentgenogram is of value many times as an additional record, but its greatest value lies in the information it gives relative to the relation of the facial outline to the jaws and teeth and the anatomic variations which accompany malocclusion. From the standpoint of research, the value of this type of roentgenogram has been ably shown in the work of Holly Broadbent, of Cleveland, in his study of the growth of the

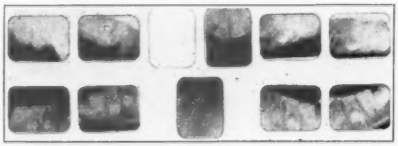

Fig. 3.—Films in inferior type of full mouth roentgen-ray examination, affording little information.

face. The technic of obtaining roentgenographic images of the facial profile has been clearly outlined by Clarence O. Simpson.[1] Valuable work in the refinements of technic has been done by Sidney E. Riesner. For detailed technic I would suggest that the writings of these men be read.

Figure 9 is a facial profile view taken at a distance of 10 feet with an exposure of two and one-half seconds and developed five minutes at 65 F. The patient was told to hold his breath during the exposure to eliminate any movement and the facial outline was accentuated

1. Simpson, C. O.: Internat. J. Orthodontia, 15:79 (Jan.) 1929.

by an application of barium sulphate mixed with vaseline to the median line of the face.

Many cases of malocclusion are complicated by faulty tongue position and abnormal tongue function. In these cases, accurate knowledge of the position of the tongue may be obtained by the roentgenogram.

Figure 10 is a film showing abnormal tongue position. This view is similar to the profile view except that markers were applied to the tongue and the palate before the exposure was made and the film was developed to show bony detail rather than the soft tissue. The tongue marker consists of a very fine precious metal necklace chain 14 inches long, which the patient swallows without difficulty. The chain is placed on the tongue, one end of the chain being held by the operator. The patient is given a glass of water and asked to drink it. This carries the chain to position, and the end held by the operator may then be fixed to the chin by means of adhesive tape.

To obtain a record of the soft tissue of the palate, a marker must be used. For this marker, a strip of tinfoil of the gage used in wrapping a package of cigarets may be used. This strip, which should be about one-fourth inch wide, is adapted to the palate by means of a camel's hair brush. The cassette is placed in position and the patient asked to hold the breath while the exposure is being made. A natural position will be obtained if nothing is said to the patient of the real purpose of the roentgenogram. After swallowing the chain, the patient is quite comfortable and if told to make himself at ease will assume a natural relaxed position. In removing the chain, care must be taken to pull it slowly to avoid irritating the throat. The shadows of the chain and tinfoil, which are easily seen, establish the relation between tongue and palate.

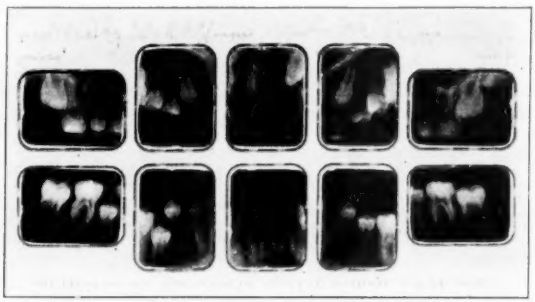

Fig. 4.—Films in inadequate full mouth roentgen-ray examination. The small dark area below the incisors might easily be missed.

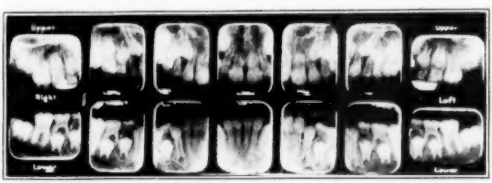

Fig. 5.—Fourteen-film roentgenogram for examination of patients over 10 years of age.

Figure 11 illustrates the normal tongue position. In this case, the chain and the tinfoil cast only one shadow because they are in apposition. This exposure was made after the act of swallowing. The tongue retains its contact with the palate and does not drop down from the palate to form a vacuum. The negative pressure within the mouth is maintained as long as the lips are closed and the tongue is in contact with the palate.

Another technic which may be employed to show the tongue has been given us by Lloyd S. Lourie. This technic may be successfully used in nervous persons when use of the chain might not be advisable. It consists of the application of a layer of a radiopaque substance such as bismuth or barium meal to the tongue before making the exposure. It is advisable to apply the tin-foil to the palate. After everything is prepared, barium sulphate, which has been incorporated in vaseline to facilitate its handling, is applied. The patient extends the tongue, which must be wiped dry by means of a towel before the bismuth is applied. A strip of bismuth paste one-fourth inch wide is applied to the dorsum of the tongue along the midline, the patient is told to close the mouth and the exposure is immediately made.

Figure 12 is a profile view made in this manner. The disadvantage of this technic lies in the fact that the paste may be dissipated. To overcome this, it is advisable that the exposure be made as soon as possible after the paste is applied. The exposure and development should be the same as when the chain is used.

Occasionally, there is an indication for an occlusal view, which presents, so to speak, a cross-section of the arch. This type of film reveals gross conditions that cannot be conveniently recorded otherwise. The occlusal roentgenogram is especially valuable in revealing fractures, gross pathologic process and the bony structure of the superior maxilla and the mandible. In orthodontia, its application is indicated in making surveys of the teeth and jaws to locate impacted teeth, in recording changes in the shape and size of the dental arches, in detecting delayed dentition, in detecting the pres-

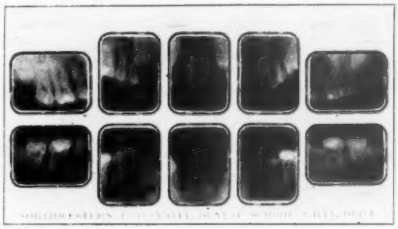

Fig. 6.—Ten-view roentgenograms for patients under 10 years of age.

Fig. 7.—Extra-oral views completing minimum requirement.

Fig. 8.—Bite-wing films.

ence of supernumerary teeth, in observing the condition of the upper jaw after operation for cleft palate, particularly when there is a failure of closure of the bony structure, in revealing odontomas which have blocked eruption of teeth and in discovering deciduous root fragments. Some men advocate their use after appliances have been placed to serve as a record of the appliance used.

There are a few points which are quite important in making this view. The film used should be a superspeed film to cut down the exposure. The superspeed film is eight times as fast as the "regular."

The film is placed in the mouth, the

Fig. 9.—Profile view.

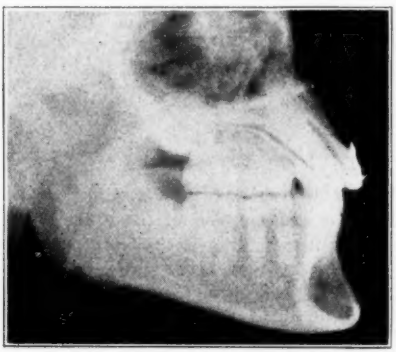

Fig. 10.—Roentgenogram revealing abnormal tongue position.

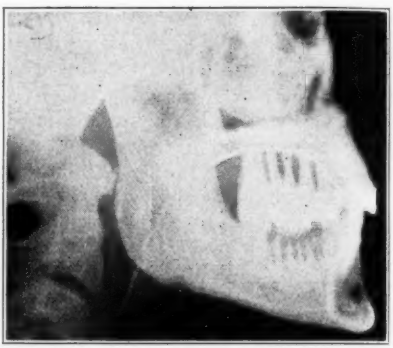

Fig. 11.—View showing normal tongue position.

Fig. 12.—Roentgenogram made with application of barium sulphate to tongue.

patient bites firmly enough to hold it in place and the head is adjusted so that the film lies in a plane parallel to the horizontal plane. The tube is placed so that the central ray is perpendicular to this plane and passes through a coronal plane which passes through the outer canthi of the eyes. (Fig. 13.) The target should be about 13 inches from the film, and with 10 milliamperes, an exposure of from 10 to 12 seconds should be given. It is developed five minutes at 65 F.

Fig. 13.—Technic used in making occlusal view of upper jaw.

Fig. 14.—Technic used in making occlusal view of lower jaw.

For the lower jaw, the film is placed in the same manner, but the head is adjusted so that the film is in a perpendicular plane. The central ray is projected perpendicularly to the film, directed at a point just above the hyoid bone on a line halfway between the angle of the jaw and the chin. (Fig. 14.) With the superspeed film, with 10 milliamperes and a target film distance of 10 inches, exposure is made from one-half to one second, depending on the type of patient.

Fig. 15.—Appearance of film as result of technic shown in Figure 13.

Fig. 16.—Appearance of film as result of technic shown in Figure 14.

Figure 15 shows the results obtained by this technic in the upper jaw, while Figure 16 shows those obtained in the lower.

It is sometimes necessary to make three views of the lower jaw, one of each side and one of the incisor area owing to the lingual tipping of the molars and bicuspids.

In many cases of malocclusion, supernumerary teeth and impacted teeth are found and a definite knowledge of their location is desirable. A number of methods to locate them have been in use, but, in my opinion, the best method is stereoroentgenography. The single plane roentgenogram is a record of superimposed flat shadows; whereas, in the stereoroentgenogram, these shadows are placed in their respective planes and the third dimension, or depth, is seen. The stereoscopic view gives the operator a confidence which other types fail to impart. As an accessory view, it climaxes all single plane roentgenography and furnishes added information, which completes the examination. When, in the treatment of malocclusion, it becomes necessary to move roots that lie in close proximity to, and in some cases overlap, each other, it is of great advantage to the orthodontist to know the exact relation of the roots to each other. The stereoscopic view will accurately reveal this relation.

Successful stereoroentgenography is dependent in large measure on the degree of care and accuracy with which the exposure is made and the films are mounted for viewing. Briefly, the right eye sees more of the right side of an object and the left eye sees more of the left side of the object. Therefore, in making a stereoscopic roentgenogram, it is necessary to produce one view which corresponds to the image that falls on the left eye and one view which corresponds to the image that falls on the right eye. When these views are placed in the stereoscope, the right-eyed roentgenogram is thrown on the right eye and the left-eyed is thrown on the left eye, and there is an apparent depth or solidity.

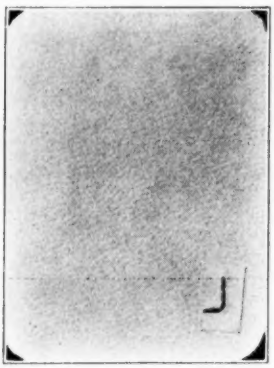

Fig. 17.—Film prepared for left-eyed exposure of stereoroentgenogram.

Fig. 18.—Left-eyed view showing the "L" marker and markers on teeth.

The technic may be divided into three steps: (1) preparatory procedure, (2) exposure of films and (3) developing and mounting.

1. To prepare the films for exposure,

one film which is to be used for the left-eyed exposure is marked with a small letter L made from a piece of brass ligature wire and fixed on the emulsion side by means of adhesive tape. (Fig. 17.) The letter L is placed in the lower right hand corner because the finished film will be viewed from the glazed side and, when viewed from this side, the shadow of the letter L will be reversed and in its natural position. The right-eyed film needs no marking.

For future aid in mounting, two wire markers about one-eighth inch long should be fixed to the patient's teeth by means of adhesive tape and parallel to the long axis of each tooth. These markers should be placed at widely separated points, the cuspids being preferable. Figure 18 is the left-eyed view showing the L marker and the markers on the teeth.

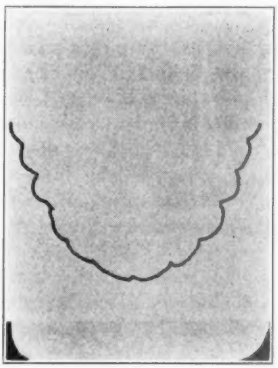

Fig. 19.—Outline of upper teeth to be used as guide in making second exposure.

The film marked L is placed in a small manila envelope, which is placed in the mouth between the occlusal and incisal surfaces of the teeth. The patient is asked to bite with enough force to hold the film in position. With a sharp pencil, the outline of the upper teeth is marked on the envelope from first molar to first molar, as shown in Figure 19. This will act as a guide in placing the second film in the same position in the mouth, which will be of great advantage in mounting the finished stereogram.

To produce a stereoscopic view, it is absolutely essential that the films be placed in exactly the same plane, although they may be in any position in that plane. To assure the operator that this may be accomplished, it is advisable that the patient be told that two exposures are to be made and that the head must not move between exposures. The patient's mouth should be opened by simply permitting the lower jaw to drop. Tipping of the head may be prevented by tying the patient's head to the headrest.

2. The roentgen-ray tube is now placed in position and centered as if for making a simple film. Now the tube is moved to the operator's left, when standing in front of the patient, a distance of $1\frac{9}{32}$ inches. The envelope containing the film marked L is placed in the mouth and the first exposure made. Envelope and film are removed, the exposed film is exchanged for a new one, placed in the envelope and replaced in the patient's mouth according to the outline on the envelope.

The tube is moved $2\frac{9}{16}$ inches to the right and the second exposure made. Exposure time and all other factors should be the same in both exposures. The distance of $2\frac{9}{16}$ inches through which the tube moved between exposures corresponds to average pupillary distance.

3. The films should be developed for five minutes at 65 F. It is advisable to place a film from each packet on the same developing rack to insure the same quality in both films. After drying, they should be mounted on a cardboard mount 7 by $3\frac{1}{2}$ inches.

They must be so mounted that the distance between the centers of the two films

is $2\frac{9}{16}$ inches, which is the same distance that the tube moved between exposures and corresponds to average pupillary distance. One film is fixed and the other is moved about while being viewed in the stereoscope until there is a fusion of the two images. The wire markers fastened to the teeth when the exposure was made are of great assistance in determining when the two images are correctly fused. When proper fusion occurs, there should be no eye-strain in viewing the stereoroentgenogram.

The stereoscopic image as seen in stereoroentgenograms which have been exposed and viewed under the same conditions is entirely free from distortion. To reproduce the shadows of the different parts in their true sizes and proportions, the tube shift must equal the pupillary distance of the observer and the films must be mounted the same distance from center to center as the tube shift. The distance from the eye to the film should be equal to the film-target distance, and the left-eyed image must be thrown on the left eye and the right-eyed image on the right eye.

Not only are the different types mentioned indicated in the diagnosis of malocclusion, but also during treatment as check-ups of different conditions and as guides to the manner of treatment. It goes without saying that at least a full-mouth examination is indicated when orthodontic treatment has been completed.

The value of the roentgen rays in problems of research has been adequately proved in past investigations, and future investigations will no doubt reveal possible uses of the rays which today the most vivid imagination cannot picture.

CONCLUSIONS

1. The roentgen rays are not used to the fullest extent of their possibilities in the diagnosis of malocclusion.

2. The true value of any roentgenogram lies in the ability of the operator to interpret it.

3. The film that excludes an abnormal condition is as valuable as the one that discovers such a condition to exist.

4. The minimum requirements of a roentgen-ray examination in the diagnosis of malocclusion consist of a fourteen-view intra-oral examination plus an extra-oral view of the right and left side. In patients under 10 years of age, the intra-oral examination may sometimes be limited to ten views.

5. In addition to the films used in routine examination, special types of roentgenograms are indicated in many cases.

6. As an accessory, the stereoroentgenogram climaxes all single plane roentgenograms.

7. The stereoscopic image as seen in stereoroentgenograms which have been exposed and viewed under the same conditions is entirely free from distortion.

8. Check-up roentgen-ray examinations during and after orthodontic treatment are always indicated.

180 North Michigan Avenue.

VINCENT'S STOMATITIS AND RELATED INFECTIONS*

By WALTER WILLIAM DALITSCH, M.D., D.D.S., Chicago, Ill.

INFECTIONS associated with Vincent's organisms have achieved popular interest in recent years, especially since the War. The inspired copywriter warns of the horrors of "trench mouth," along with "pink toothbrush," "the danger line," "athlete's foot," etc. Undoubtedly, fusospirochetal infections have assumed increasing importance and are probably increasingly prevalent. There is considerable literature on the subject by many writers, but much of it is scattered and confusing, and many points remain obscure.

A consideration of the varied aspects of this infection in both normal and diseased states should lead to a better understanding of the condition and its more effective management.

The origin of the infection is not recent. Probably, one of the first microscopic organisms seen by the human eye was this spirillum, which was described by Leeuwenhoek in 1683 as occurring in smears and tartar removed from the teeth.[1] The typical occurrence of the organism is in the form of the fusiform bacillus and the spirillum. The bacilli may appear as long or short thick rods, often curved, and are gram-negative and nonmotile. The spirochetae are fine or coarse, forming from four to ten turns and are actively motile and gram-negative. They may be distorted by smearing to linear, curved or ring shapes. Simple staining is best with gentian violet or carbol fuchsin. Methyl blue is quite unsatisfactory. The organism is usually found in association with a variety of other bacteria, especially staphylococci and streptococci of viridans and hemolytic types, and filamentous forms (leptothrix).

The fusiform bacilli can be grown in anaerobic culture, but the spirochetae fail to grow. In the tissues, it has been found that spirochetae occur in the deeper layers of a morbid lesion and seem to invade the tissues in advance of the fusiform bacilli. Thus, a superficial smear may show only bacilli, while examination of deeper areas may reveal spirochetae.

These bacteria have a varied distribution in the body, occurring in both health and disease. Normally, they are found frequently around the necks of the teeth with food débris and tartar. They are abundant in the caseous granules found in the crypts of tonsils.[2] The spirochetae, but not the bacilli, have been demonstrated in normal stomachs in the lumen of the gastric glands. About the genitalia,[3] they have been found in the smegma of 51 per cent of normal uncircumcised males and in over 60 per cent of normal pregnant females. In diseased conditions, their distribution is wider and of greater importance.

*Read before the Staff Meeting and Pathology Conference of the University Hospital of Chicago, Jan. 23, 1934.

1. Davis, D. J., and Pilot, Isadore: J.A.M.A., 79:944-951 (Sept. 16) 1922.

2. Pilot, Isadore, and Davis, D. J.: J. Infec. Dis., 23:562 (Dec.) 1918.

3. Brams, J.; Pilot, Isadore, and Davis, D. J.: J. Infec. Dis., 32:159 (Feb.) 1923.

In acute ulcermembranous gingivitis and stomatitis, as described by Gilmer[4] and Tunnicliff,[5] the organisms are very abundant. Fusiform bacilli and frequently spirochetes are found in putrid alveolar abscesses, along with streptococci.[6]

In pyorrhea (chronic suppurative periodontitis), they are almost always present in large numbers. Although in most cases of this disturbance, they are secondary invaders, they probably account for some of the putrefaction, foul odor and necrosis which occur. Similarly, they are found in large numbers in cases of mercurial stomatitis and in scurvy, aggravating and complicating the initial condition.

Teething in infants, which should be a physiologic process, when accompanied by fever, adenitis, anorexia and marked fretfulness is probably complicated by illness or infection. Frequently, examination of the mouth reveals inflammation and bleeding of the gums over an erupting tooth, a characteristic of fusospirochetal stomatitis.

The necrotic and gangrenous involvement of the cheek and maxillary region, known as noma, is probably a result of the deep invasion of these tissues by the fusospirochetal infection. This occurs in debilitated children, following an acute infectious disease such as measles, and probably has its origin in a preceding gingivitis and stomatitis.

Occurring in Vincent's infection, this condition produces an ulcerated and necrotic pharyngitis and tonsillitis. It is not unlikely that this condition may start in the mouth and invade the pharynx by direct extension or that the tonsillar crypts may provide the original source of infection.

In the respiratory tract, putrid pneumonia and lung gangrene produce a foul, fetid sputum which teems with fusiform bacilli and spirochetes. Also, in putrid bronchitis and bronchiectasis and in lung abscess, the presence of these organisms is quite characteristic. As a complication of these respiratory invasions, metastatic brain abscess may occur, presumably from hematogenous emboli. These abscesses are often multiple and contain fetid pus with anaerobic filamentous and fusiform bacilli.

Most of these cases of respiratory infection have neglected mouths with caries, deposits of tartar and food débris. The tonsils often show an excessive growth of bacteria. Frequently, the lung disease follows some surgical procedure and general anesthesia. Thus, it seems evident that the pulmonary invasion is often a result of direct aspiration of bacteria from the mouth or throat.

In otitis media, the foul purulent discharge from the middle ear may show *B. fusiformis,* spirochetes, cocci and diphtheroids, and Holt has described "noma" of the ear following otitis media.

Infections of the skin with this organism, with a characteristic foul and gangrenous appearance, following bites or contamination with saliva, have been observed. One case of acute partial gangrene of a finger was seen in a girl who habitually bit her finger nails. The fusospirillar organisms were present about her teeth and also in the gangrenous wound.[7]

In the gastro-intestinal tract, fusiform bacilli and spirochetes are often found in the necrotic ulceration occurring with gastric carcinoma. It seems not unlikely that they are responsible for the foul smelling ulceration that complicates carcinoma of mucous surfaces. In appendicitis with gangrene, infection with spirochetes and fusiform bacilli has been held

4. Gilmer, T. A.: D. Rev., 20:459, 1906.

5. Tunnicliff, Ruth: J. Infec. Dis., 4:8, 1907.

6. Davis, D. J., and Moorehead, F. P.: J. D. Res., 5:1 (March) 1923.

7. Hultgen, J. F.: J.A.M.A., 55:857, 1910.

responsible for the gangrenous process in a considerable number of cases.[8]

Ulcerogangrenous lesions about the genitalia are encountered. In ulcerative and gangrenous balanitis, fusiform bacilli and spirochetes have been observed constantly and in large numbers.[9] These cases did not give a history of saliva contamination, and the assumption is that these organisms, which are normally present in such locations, have become pathogenic.

Of considerable interest in recent years has been the frequent association of fusospirochetal infection with various blood dyscrasias. Agranulocytosis and neutropenia are quite commonly associated with ulceromembranous stomatitis and angina. Often in anemia, leukemia and purpura, we find a characteristic stomatitis or pharyngitis.

The relationship in these conditions is not always clear. It is possible that the infection occurs as a result of the lowered resistance of tissues consequent to the disturbed blood condition. It is also possible that the blood disturbance is a result of depressed function of hematopoietic tissue due to the action of toxins arising in the infected mouth or throat. We have seen one case wherein attacks of neutropenia occurred on three separate occasions, always preceded by an ulceromembranous oral or pharyngeal infection.

Another case, a thrombocytopenic purpura, showed persistent bleeding from the gums with extravasation into the skin for seven months. During this time, all methods of therapy were tried including liver, high vitamin feeding, injection of whole blood and seven transfusions, with little or no relief. Finally, careful and thorough eradication of a chronic fusospirochetal gingivitis resulted in prompt improvement, with an increased platelet count, gain in weight and strength and cessation of bleeding. Here, it would seem that the oral infection resulted in a depression of that portion of bone marrow which controlled platelet formation.[10]

The question may arise as to why the fusospirillar bacteria are found under normal conditions and again in diseased states. As is true of other bacteria, such as staphylococci on the skin or pneumococci in the respiratory tract, these organisms are opportunists. They are found in small numbers in certain locations, producing no disturbance. When circumstances become favorable for proliferation and invasion, they cause disease. The conditions which may allow them to assume a pathogenic character are: (1) lowered resistance of the tissues; (2) increased virulence of the organism, and (3) transplantation of the organism from a normal location to an unusual region.

Lowered resistance of the tissues is seen especially in the mouth as a result of any of the following factors: (1) vascular changes as seen in scurvy and secondary purpura; (2) blood dyscrasia, as in anemia; agranulocytosis, leukemia, essential purpura, etc.; (3) trauma and irritation from poor fitting prostheses, calculus, food débris, faults of occlusion; (4) chemical toxins, as in mercurial and bismuth stomatitis (excessive use of tobacco may be listed here); (5) infections with other bacteria (streptococci, staphylococci and tubercle bacillus infections may have a superimposed fusospirochetal infection); (6) dietary deficiency, which may, because of a lack of protective accessory food substances, cause a tissue susceptibility.

Such conditions lower tissue resistance,

8. Heyde: Beitr. z. klin. Chir., 76:1, 1911.

9. Corbus, B. C.: J.A.M.A., 60:1769-1774, 1913.

10. Dalitsch, W. W.: M. Clin. North America, 17:6 (May) 1934.

favor increased growth and virulence of the organism and allow deeper invasion.

That the bacteria may occur in a strain of increased virulence seems likely as is seen in the epidemic forms of Vincent's infection. Contagious or epidemic forms of noma have been described. We must assume that the heightened virulence is the important factor in infection rather than any predisposing weakened tissue resistance.

Transplantation from a normal habitat to an unusual location is seen in the pulmonary conditions wherein aspiration of oral or tonsillar débris causes marked invasion of the lung tissues. The organism does little harm while confined to the mouth, but is quite destructive in its new field of activity. Again, in noma, we may find the bacteria of little importance when confined to surface areas, but assuming a very harmful character when reaching the underlying deeper structures. In their usual locations, an equilibrium is established between tissue resistance and bacterial virulence, and no disease occurs. When they are carried to fresh soil, lessened resistance and greater virulence lead to active infection.

In a consideration of treatment, prophylactic measures should emphasize the importance of thorough mouth hygiene. Removal of deposits of food and tartar from about the teeth, correction of faulty dental prostheses under which infective organisms may be harbored, regular brushing and use of the dental floss will diminish the quantity of bacteria in the oral cavity, and reduce the incidence of infection occurring therein.

There is a close relationship between Vincent's infection and the excessive use of tobacco, especially cigaret smoking. Whether the products of tobacco smoke are in themselves irritating and harmful to the oral mucosa, or whether smokers are more neglectful of oral hygiene is not clear; but more cases of chronic Vincent's gingivitis certainly are found in smokers' mouths. There is a definite increase in the incidence of this disturbance in females since the use of cigarets has become so popular among them. If the consumption of tobacco cannot be decreased or avoided entirely, some benefit may be seen from the use of a cigaret holder, which will precipitate and filter the tarry distillates from the smoke before it reaches the mouth.

Removal of the tonsils or draining of the crypts will lessen the frequency of fusospirochetal pharyngitis and angina.

These precautions should be especially observed in persons about to undergo anesthesia for any purpose, but especially in tonsillectomy, wherein the contents of the crypts may be squeezed out by the snare. Such care should reduce the frequency of aspiration pneumonia and lung abscess following anesthesia and surgery.

The prevention of the epidemic forms of trench mouth calls for avoidance of intimate contact with active virulent cases. Kissing on the lips should be avoided. Thorough sterilization of eating and drinking utensils and dental instruments is necessary.

Fusospirochetal infections of the genitalia may be avoided by frequent cleansing of the parts, and probably by circumcision in some cases.

In the active treatment of local manifestations of this infection, oxidizing substances, notably peroxide of hydrogen, sodium perborate and potassium permanganate, yield good results. Topical applications of solutions of arsenicals, such as arsphenamine, in glycerine directly to the ulcerated lesions seem to be of benefit. It should be emphasized that frequently repeated applications of these remedies, probably every two or three hours during the day, are necessary, as any medicament in the mouth is soon diluted and washed

away by saliva and can have only a transient action.

Systemic administration of arsenicals has been advocated, especially in inaccessible types of fusospirochetal invasion such as lung abscess. Arsphenamine and neo-arsphenamine are effective spirocheticides, and their use against the Vincent's spirillum is rational. Good results have been reported, but conflicting opinions as to the value of this procedure prevail for three reasons: 1. These remedies do not affect the associated bacteria, notably the fusiform bacillus. (2) Severe fusospirochetal infections, especially ulceromembranous gingivitis, are often encountered in persons who have had considerable arsenic therapy for syphilis. 3. Arsphenamine administration by the intravenous route may cause toxic injury and depression to the blood-forming tissues, resulting in agranulocytosis, purpura, etc.[11]

Therefore, arsenical medication should be used with caution. Although it may be of benefit when the spirochete is the predominant infecting organism, it may be of little value in other cases and may even be of distinct harm.

11. Kugelmass, I. N.: J.A.M.A., 99:11 (Sept. 10) 1932. Tice, Frederick, and Jaffe, R. H.: M. Clin. North America, 17:341 (Sept.) 1933.

CONCLUSION

1. The fusiform bacillus and spirochete are normally found in certain locations of the body without producing disease; namely, around the teeth, in tonsillar crypts and on the genitalia in smegma.

2. A more varied and widespread distribution of these organisms occurs in disease conditions of a gangrenous and putrid character; namely, ulcero-membranous gingivitis and stomatitis, Vincent's infection, putrid otitis media, lung abscess and putrid bronchitis; also in gangrenous appendicitis, ulcerous carcinoma and gangrenous affections of the genitalia. An association with blood dyscrasias is sometimes seen.

3. The pathogenic character of the organisms is dependent on conditions favorable to development, an increased degree of virulence and transplantation to new locations. The mouth and tonsils are frequent foci for distribution of the infection.

4. The incidence of infections of this character should be diminished by rational prophylactic and active treatment.

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Editorials

ORGANIZED DENTISTRY AND THE 1934 MEETING

The greatest hope of the profession lies in organized dentistry. In the days before we had organizations, there were certain men whose native ability carried them beyond the rank and file of their fellows, and whose names stand out as beacon lights of dental progress even to this day, but they were so few in number that they could be counted on the fingers of one hand.

The moment that organizations started to get under way, the names of progressive men multiplied in encouraging ratio, and dentistry began to take on professional status. From that time till now, dentistry has steadily advanced in unison with the growth of our organizations, and it is only by virtue of these organizations that the profession will continue to register the greatest advance.

By common consent, the supreme and outstanding dental organization of this country is our own American Dental Association, and its annual meetings may therefore be accounted the mileposts

on the way of our professional progress. The coming meeting in August promises to be of unusual caliber. The President, Dr. A. C. Wherry, has been for months devoting much of his time toward conserving the best interests of the Association, and helping to build a program that will be most attractive. He has traveled extensively getting an intimate line on the present needs of the organization and the profession, and he is in every way qualified to interpret these needs for the benefit of the Association. The other officers are all working together with a will, as well as the various committeemen, the chairmen of the sections, the clinicians, etc.

In addition to the names of the men who are to address the general sessions as given in our June issue, the President has secured the attendance of Dr. Frederick C. Warnshuis, of Grand Rapids, Mich., as an essayist. Dr. Warnshuis is permanent speaker of the house of delegates of the American Medical Association, and an associate editor of its journal. He will present the A.M.A. side of economics and practice, and his address should elicit universal interest.

As an indication of the activities among the section chairmen, the following statements will be enlightening:

For the Section on Mouth Hygiene and Preventive Dentistry, such topics will be presented as a symposium on public health, consisting of six twenty-minute papers; pulpless deciduous teeth—to extract, or to treat; conductive anesthesia for children, and the dental care of children generally.

The Section on Full Denture Prosthesis will deal with the biologic and technical phases, as well as ridge preparation, and the various base materials.

The Section on Periodontia will constitute what really amounts to a postgraduate course for the general practitioner as well as the periodontist, taking in all phases of disease of the supporting structures of the teeth.

The Section on Partial Denture Prosthesis has gathered the best available talent from all corners of our own country as well as from Canada and Mexico.

The Section on Oral Surgery, Exodontia and Anesthesia, which will interest in particular the general practitioner, is rounded out

by a moving picture by George B. Winter on "Removal of the Mandibular Third Molar."

The Section on Histology, Physiology, Pathology, Bacteriology and Chemistry will deal mostly with research projects of particular interest at the present time.

The Section on Operative Dentistry, Materia Medica and Therapeutics will have as its chief theme a balanced program in keeping with the most progressive thought of the hour on these subjects by men of prominence in the profession.

The Section on Orthodontia always comes in for more than the ordinary interest, and manifestly the chief appeal is to the general practitioner, though the needs of the specialist will not be forgotten.

With a program such as this, and also as indicated in greater detail in the present issue, there should be every incentive for a very large attendance at the meeting in St. Paul. It is true that every member of the Association receives full value for the money he pays in dues, even though he does not attend the meetings; but the acme of associative success and recompense is achieved only when each member avails himself of the privilege of attending the meetings in person. There is something more than worth while in the hearty hand clasps among friends; in the meeting of close associates who have worked together for years; in the welcome of new recruits—ah, here is a thrill and a privilege incomparable with any other—and in the small group conferences around the hotels and meeting places, where intimate discussions are held over the various problems that assail the practitioner in every day experience.

Men of every tendency and temperament may find ample outlet for their impulses, and ample reward for their efforts by attending our annual meetings.

Come to St. Paul, August 6-10!

THE DANGER OF DEMORALIZATION

The responsible element of the American people may always be relied on to meet any emergency that comes to them. As a nation, we make mistakes in common with every other nation—such seems

to be the propensity of our poor human limitations—but in the essentials of our individual and community life, the core of the American character will always be found sound and eminently sane and trustworthy. Had not this been true, our nation would never have ascended to its present place in the sun in the period of a century and a half.

The test of virility comes in the presence of calamity and trial. Provided a people are stable at heart, their moral fiber is more closely knit by adversity. The fabric of a nation's character is, after all, woven in the warp and woof of trial and error, of failure and success, of bitter defeat and wholesome triumph. Without the leavening lump of experience of all kinds, a people can never be raised to the full stature of national greatness. Real grandeur whether of men or of nations comes only through an alembic distilled from the aching hearts of humanity.

This country has passed through many periods of storm and stress, and each one has left its scars of battle, and each its fruits of gratifying achievement. To go no farther than the recent economic upset, we are beginning to visualize something of the sanctity of wholesome sacrifice; and unless we have a care, we shall also reap in our professional ranks certain of the bitter fruits of a disastrous demoralization.

With every laudable incentive, there comes the penalty, or at least the possibility, of doing harm. Good intentions are always praiseworthy, but good intentions are not proof against injurious or untoward results.

When the need became apparent that the teeth of the indigent must be cared for regardless of their ability to pay, all sorts of plans were proposed to meet the emergency. With honesty of purpose, but with a woful lack of vision, certain policies were advocated that, as far as their end results were concerned, were little short of pernicious. The first principle of any dental creed that should be laid down in an industrial emergency of this kind is of course that no person, however poor, should be allowed to suffer from toothache. Too many individuals have been educated in dentistry in this land of ours to make it necessary to withhold relief from pain associated with the teeth. This is axiomatic and there should

be no quibble about it. Particularly in the case of little children, and the aged and infirm, there should never be any question raised as to ability to pay when it comes to relief. The impulses of the hearts of the dental profession may be relied on to see that no human being shall be permitted to suffer pain from affections of the teeth. And it may be said in passing that this has always been true ever since we had a profession.

But there is another side to the picture, and it is a certain phase of this side to which we should like to call attention at this time. In doing this, we run the risk of raising a hue and cry of "man's inhumanity to man," but we shall not do the subject full justice without at least mention of the danger of demoralization from indiscriminate charity even in the case of an emergency such as we have just been facing. It is a well-known and oft-repeated fact that anything that saps the morale or breaks down the independence of a man or of a nation is bad, and the moment that any able-bodied individual accepts something for nothing, that moment there begins in that individual a moral disintegration that starts him straightway toward dependency and pauperism. Not only that, but the abuses that sometimes creep into the most laudable efforts to administer aid under an emergency are so notoriously flagrant that they must give us pause and make us reflect on what we are doing. In the April 3, 1934, issue of the *Bulletin of the Seattle District Dental Society,* we see the following: "Too much Brotherly Love—Philadelphia may be the City of Brotherly Love, but, in the opinion of Mayor Moore, it has gone too far with its big-heartedness. 'It simply cannot last much longer,' the Mayor told Philadelphia County Medical Society members at a recent gathering to consider the question of state medicine. 'Free medical, dental, and hospital service is being demanded and received by many supposedly destitute who are, as a matter of fact, better dressed than I, and some of whom die and leave substantial estates to their relatives!' "

Recognizing all of this, some of our well-intentioned but impractical philanthropists of the recent past have sought to meet the situation by advocating the establishment of what are termed low-fee clinics. And in doing this they have unwittingly inaugurated the possibility of much harm. The principle of low fees in an emer-

gency like this may be praiseworthy, but the propaganda is pernicious. In the minds of the people, the value of dental service bears some relation to the fees that are charged for this service, and to herald to the public a fee bill of such a ridiculously low order as some that have been published is nothing short of degrading to the dignity of the profession. To publish the fact that as difficult an operation as may be involved in the extraction of a tooth, to say nothing of the insertion of a filling, commands a fee of only 25 cents, particularly in any metropolitan area, is akin to offering an insult to the reputation of dentistry. Let us take care of the poor and unfortunate to the best of our ability, as we have always been willing to do in the past, tempering the wind to the shorn lamb, but let us not drag the fair name of our calling in the mire by leaving the inference that we are unworthy of a recompense less than that of a day laborer minus any brains.

As a matter of plain fact, there has always been too much talk about fees in our profession, and it has injured us in the estimate of the public. For a long time, we were treated to a constant exploitation of the fee question, and our literature was filled with discussions on fees. In the hey-day of high finance, some members of the profession prided themselves on the grotesque fees they were receiving, till it began to be a by-word in the land, all of which reflected seriously on the reputation of the profession.

Now let us not go to the other extreme of belittling ourselves by publishing estimates for professional compensation that will minimize any incentive for performing a reputable class of service. If, in certain instances, we elect to work for a meager fee, that should be our privilege, but let us not herald to the world a measure of reward for our services that is relatively below a mere pauper's pittance.

THE FINAL PARAGRAPH

A summary, conclusions, a terminal abstract may not be regarded as essential to a scientific paper, but it is a tremendous convenience, and more than a convenience. Most of the treatises that come to THE JOURNAL—to all dental journals—are not summarized,

give no conclusions, append no abstract. Perhaps writers regard such as unnecessary appendages, added burdens to a worker already overloaded, a waste of time. After the labor of months, collecting, assaying, evaluating, a place to stop in the distasteful process of writing is welcome. This is easily understandable.

Many instances come to mind to prove that a summary may be of value. In the first place, a paragraph of summation would show to the writer himself how clear, consecutive, logical he has been. As a test for the worth of the paper, before it leaves the hands of the author, it may have a disquieting or comforting effect. The final paragraph may well say, "Not quite ready," because it has proved hard to write or, "Well done," because of its easy statement.

It is said that some papers will not submit to summary or abstract. There appear papers containing vast theorizing upon the frontier of some domain. They deal in algebraic formulas, showing the far wandering of the author's mind, but are utterly unintelligible to the majority of men. In such instances, it might be that the writer has mistaken his audience and the editor has slipped in admitting the paper to a journal for general reading. It is sometimes obvious that the author has spoken too soon, before his material has clarified to his own mind. There is no collectible precipitate.

Then, too, a summary may stir a deep appreciation in the mind of the reader because it gathers into a compact bundle the findings, declarations, deductions that otherwise he would have had to search out again in order to fix them in his memory. A man reads a paper for the enjoyment of instruction, with a sense of filling his mental coffers with the coin of some particular realm. In the summary, he counts his gains and listens to the jingle of the coins that he has gathered in his pocket.

But the appended summary, conclusions, abstract are more than a courtesy. It must not be forgotten that all writings are for readers, are meant to increase interest in a given field. Many men scan articles for catch lines to see if the whole may be interesting, skim the columns for phrases that protrude, arrest attention and assure him that the whole is worth his time. How much easier it would be to read the final paragraph for this purpose! Caught by the pungent statements there, the reader says, "I'll read all of the

paper and see how the writer attained those conclusions." Thus, the summary invites the reader to go on a profitable journey.

Finally, all articles published in the leading journals are abstracted somewhere. Some American journals abstract from other American journals quite freely, following a loose method of selection. The result is not always gratifying to the men who wrote the papers. Abstracts in our home journals are not always well done, for the reason, perhaps, that no journal has put abstracts above the rank of fillers. Our journals do not take the function of the abstract seriously. And dental officialdom has considered it not at all. Foreign journals have the language difficulty to contend with, and translations may show surprising variations from the original text. The brief, pointed conclusions of the author lend themselves to translation much more readily than the more complicated forms of the argument. A summary would ease the path of the abstractor, whether domestic or foreign, and an abstract made by the authors would be a benefaction to such workers.

Summary, conclusions, abstracts have been used relatively in this treatise, not because they are thought of as synonyms, but because they lend themselves to inducement of the reader, final emphasis, understanding of the abstractor and justice to the writer. Obviously no one can abstract an article so well as the man who wrote it.

T.

THE AMERICAN DENTAL FOUNDATION

In previous issues, we have called attention to the great desirability of building a foundation in the dental profession for the benefit of projects worthy of the consideration of all good men. The objectives were outlined in a previous issue (March, 1933), and what we now have in mind is to urge all of those who have made wills (and all sensible men make wills) to add a codicil instructing the executor to pay out of the estate a certain sum, great or small, to the American Dental Foundation. The worthiness of this project cannot be questioned, and it is likely that there are many of our dentists who would really like to add such a codicil if the idea ever occurred to them. Here is the reminder.

Obituaries

FRANK O. HETRICK, D.D.S., F.A.C.D.
(1859-1934)

Frank O. Hetrick, a Past President of the American Dental Association, and practitioner of dentistry for fifty-two years, died May 17, at his home in Ottawa, Kas., after a year and a half of failing health due to a malignant condition of the esophagus.

Dr. Hetrick received the degree of D.D.S. from Kansas City-Western Dental College. He received his elementary education in Mansfield, Ohio, where he was born, Oct. 5, 1859.

After fifty-two years in practice, Dr. Hetrick disposed of his dental equipment and office in Ottawa to accept a position with Lee Smith and Sons of Pittsburgh, Pa. He was to demonstrate and lecture on a new type of plate, but failing health forced him to return home within a short time.

Dr. Hetrick held many positions of honor in the dental organizations with which he was connected, among them the presidency of the National Board of Dental Examiners. He was a civic leader in his own community, being at one time mayor of Ottawa. He was widely known for his charitable work.

Dr. Hetrick was married in 1881 to Miss Hattie St. John, who survives him, together with three sisters.

F. BLAINE RHOBOTHAM, D.D.S.
(1891-1934)

F. Blaine Rhobotham, head of the children's clinic of Northwestern University Dental School since its establishment in 1921, and known throughout the country as the leading pioneer in dentistry for children, died May 30, after three weeks' illness from a gallbladder infection.

Dr. Rhobotham graduated from the Northwestern University Dental School in 1917. Since 1927, he had been associate professor of operative dentistry at the university. He was a delegate to President Hoover's conference on child health and protection in 1930.

Dr. Rhobotham was 43 years of age at the time of his death. He is survived by the widow, one son, F. Blaine, aged 13, and his father, De Alton Rhobotham.

PRACTICE IN PARAGRAPHS

This department is intended for busy readers. It aims to tell a vivid story in a few words. Items should be of a practical character, and free from padding—not more than a paragraph or two. We exact no limit, but two hundred words can tell most of these stories. Send in your ideas; they will be welcome.

Care After Extraction—A wild deer when hit with only one buck shot and injured no more than a patient with an ordinary extraction will lie down in the sun and lick the wound. It might, therefore, in consideration of probable secondary hemorrhage, be wise to instruct patients to refrain from lifting, hurrying or unnecessary exercise immediately after an extraction. The soothing caress of the tongue on the new wound and the rays of the sun might benefit the patient as well as a deer. The patient should be given a printed booklet on after-extraction care, with verbal instructions not to drown the wound with all sorts and flavors of mouth washes.—*Herbert Ely Williams, Red Bank, N. J.*

"Telltale" Saliva Ejector—All-glass mouth pieces for saliva ejectors sometimes break. All-metal ones do not indicate flow of saliva through them. Waxed paper mouthpieces with rubber tubing and connections are now available. Wrap 1½ inches of adhesive tape around the straight end of a paper mouthpiece. Fit this into the end of a used anesthetic glass carpule cylinder. The rubber tube connection will slide into the other end of the carpule tube. You will then have an indicator enabling the dentist to keep his eye on the flow of saliva.—*Herbert Ely Williams, Red Bank, N. J.*

Moving an Interlocked Upper Central or Lateral Incisor in Line—Take an impression of five or six teeth of the lower jaw opposite the interlocked tooth, and make a vulcanite plate with a little projection so constructed that when the patient closes the teeth, the bearing is all on the locked tooth. In the case of a boy, 9 years of age, the upper right central was inside of the arch, and this tooth was brought in line in less than a week.—*E. Harvey Richmond, Windsor Locks, Conn.*

Some of the Amenities of Practice—While it is rare for a dentist to be compelled to leave his patient and answer the telephone during an operation, emergencies of this nature do occur occasionally. In every such instance, there is one cardinal obligation that should never be overlooked—the operator should never return to the patient without washing his hands. To handle a telephone that has been used promiscuously by the public, and then go to the patient without washing the hands is beyond the pale of propriety. Likewise, if an inlay or crown is dropped on the floor, it should be carefully cleaned with an antiseptic before being inserted in the tooth. Patients of refined taste are alert to any lapse or carelessness in this respect, and the operator must be constantly on guard to subscribe to the exactions and amenities of professional

practice. In other words, the patient is entitled to the most exquisite care and consideration with regard to cleanliness in all of its phases.—*Editor.*

Gagging—The placement of a dental film packet against the mucous membrane of the soft palate or the anterior pillar of the fauces gives rise to violent involuntary spasms of regurgitation, and so adds materially to the difficulties of the practice of radiodontia. Gagging caused by the placement of dental films in the mouth, may be prevented, or at least combated, in three ways: 1. By skilful, positive and rapid operation. 2. By winning the cooperation of the patient. 3. By medication. The vertical x-ray angle should be set and the entire manipulation of the "unit" should be as nearly completed as possible before the film is placed in the mouth, so that it may be left as short a time as possible. The film packet should be put in place gently but firmly, without unnecessary shifting or hesitation. A somewhat dominating manner on the part of the operator will sometimes be effective, sometimes not. The operator must use judgment. To act as though you expected gagging, invites it; the reverse in attitude discourages it. When unmistakable signs of gagging occur, the operator may reassure the patient. He may point out that the time of exposure is short, that the packet will not cause injury, that there is no danger of swallowing it. (It is obvious that some people are afraid of the latter.) Diplomatic mention of the fact that the bill is sometimes higher for patients who gag sometimes helps. The most effective suggestion the operator can make is to inform the patient, in a confident manner, that "it is possible to keep from gagging as long as you can hold your breath," and that the exposure can be completed in that length of time. If other efforts fail, resort may be made to medication. An anesthesin-calcidin tablet (Abbott) dissolved on the tongue produces a slight degree of numbness, which is usually sufficient. If further medication is necessary, any of the solutions employed to prepare the tissues for taking an impression can be used or, in extreme cases, as a last desperate measure, local or block anesthesia.—*Howard R. Raper, Albuquerque, N.M.*

A Scrap-Book for the Waiting-Room—Some months ago a dental supply salesman suggested that a very effective scrap book telling the story of the teeth by illustrations could be made for the waiting-room table. The idea was brought home to my wife, who has considerable creative ability, and she immediately set about laying out and designing an interesting story concerning the building of healthy mouths and teeth. For weeks, old magazines were scanned for appropriate pictures and proper captions to fit each picture. The story started with the marriage ceremony, showing the union of two fine healthy young people. Then came the suggestion of the advent of a little one in the home, the proper care of the mother during this period, the birth of the child, the development of the infant, the first tooth and the importance of all the succeeding "baby" teeth, the diet of the child, fresh air and exercise as an important factor in the child's health, and so on, until the entire story of the importance and the care of the teeth had been told. Such a scrap book has many possibilities, according to the creative ability of the one who designs it. Its practical value comes not alone from its educational feature, but also from the fact that it is interesting and entertaining for the children who may be waiting for an appointment. It will be found to be another means of using visual education to impress on the mind of the patient, child and parent alike, the relationship between healthy teeth and healthy bodies.—*Rex N. Douglas, Elkhart, Ind.*

COUNCIL ON DENTAL THERAPEUTICS

STATEMENT IN LIEU OF THE USUAL REPORT OF THE COUNCIL

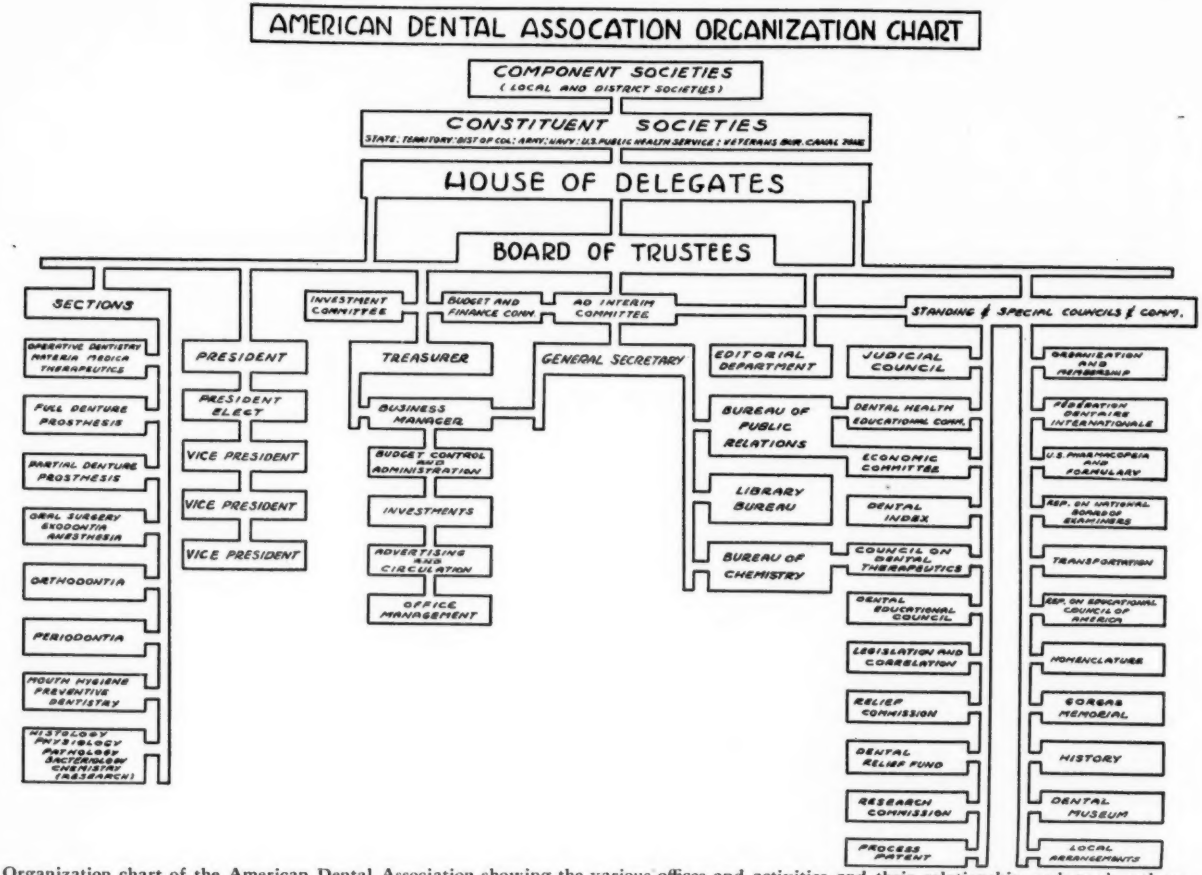
To the end that the best interests of the Council and the Association be conserved in every way, it is felt that the most careful deliberation should be given the question of reports in THE JOURNAL, and when the report for the July issue was under consideration, it seemed to call for so much deliberation, and the time was so short on account of the program number of THE JOURNAL coming at this time, that it was deemed expedient not to attempt the regular report in this number.

This decision was arrived at after careful consultation between the chairman of the Council and the Editor of THE JOURNAL. In lieu of this report, the chairman and the Editor contemplate having a conference in the near future with the sole object of making suggestions whereby the work of the Council may be expedited, and the greatest cooperation between the Council and the Trustees be achieved to the end that this outstanding and altogether necessary work may thereby be carried to the fullest fruition.

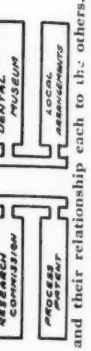
It is confidently believed that with the proper understanding there will be little difficulty in arriving at an equitable basis of agreement among all of those concerned, and the importance of having this consummated is so great that the Editor begs the indulgence of our readers for the present till this can be brought about.

It is recognized of course that neither the chairman nor the Editor can exercise on his own behalf any mandatory authority in the matter, but merely that they are willing to volunteer their offices in suggesting possible lines of action that will be agreeable to all.

C. N. JOHNSON, *Editor*



Organization chart of the American Dental Association showing the various offices and activities and their relationship each to the others.



Organization chart of the American Dental Association showing the various offices and activities and their relationship each to the others.

BUREAU OF PUBLIC RELATIONS

SOME PHASES OF RECENT DEVELOPMENT OF DENTAL HYGIENE IN JAPAN*

By TSURUKICHI OKUMURA, Tokyo, Japan

JAPAN is very eager to promote the health of her nation, and dental hygiene is regarded as one of the most important essentials to that end. As indicative of recent developments in this endeavor, in this paper will be outlined (1) research bearing on preventive dentistry as conducted in Japan during the last few years, and (2) the oral hygiene program being carried out in Japan today.

RECENT RESEARCH PERTAINING TO PREVENTIVE DENTISTRY

Recent research has covered a wide field of dental and oral problems. Studies have concerned (1) influences on the teeth during their development, (2) influences on the teeth after their eruption and (3) the relations of the teeth to the whole body and its health.

1. *The Nutrition Problem.* — Foremost among the investigations regarding developmental influences on the teeth are those regarding nutrition. These have been concerned with the vitamins, especially A, C and D; to some extent, with the mineral content of the diet, and somewhat with the organic food content.

Dr. Masaki, in various experiments on animals, found that changes in the teeth and their investing tissues due to deficiency in vitamin A are of the character of osteomalacia, and, in dental tissues, disturbance of calcific deposits and dislodgment of the calcium salts from the already calcified tissues were produced. The same changes occurred in the jaw bones, but only to a slight degree. Dr. Masaki also found that, in those animals fed on a diet deficient in vitamin A, the epithelial lining of the mouth, gums, tongue and nasal cavity underwent hyperkeratosis, atypical proliferation of the epithelium and, at the gingival portion, papillomatous changes. The cells of the salivary glands underwent atrophy and necrotic changes. The epithelium lining the excretory ducts showed marked cornification. These changes may reasonably be considered as precancerous. Dr. Masaki produced gastric cancer in animals fed on certain experimental diets.

Dr. Shiabata, after certain research studies on animals, came to the conclusion that loosening of teeth, deposition of tartar and pyorrhea alveolaris were, in those animals, caused by vitamin A deficiency. He could not find any changes in the dental tissues in vitamin B deficiency.

In acute scorbutic cases wherein animals had been fed by Dr. Masaki on a vitamin C deficient diet, changes in dental tissues were found; that is, circulatory disturbances, and retrogressive changes

*Read at the Seventy-Fifth Annual Session of the American Dental Association in conjunction with the Chicago Centennial Dental Congress, Aug. 10, 1933.

were produced in the soft dental tissues. Gum bleeding occurred only in rare instances.

Dr. Masaki first made investigations on animals on a vitamin D deficient diet with high calcium and low phosphorus content, and found that the hard dental tissues showed a generally imperfect development, and an extensive part of the alveolar bone remained as uncalcified tissue. Normal structure of the bone was lacking, and homogeneous structural parts manifested rachitic changes with osteoatrophy. Repeated attempts to feed animals with vitamin D deficient, high phosphorus and low calcium diet resulted in the same changes in the hard dental tissues as in the former case. Next, Dr. Masaki proceeded to feed the animals a diet containing a proper amount of vitamin D. In these cases, imperfect calcification was somewhat checked, yet rachitic changes could be demonstrated in the tissues. Therefore, he made further investigations to determine whether vitamin D or phosphorus and calcium has a primary relation to the development of hard tissues. He employed an experimental diet containing an adequate proportion of calcium and phosphorus, but deficient in vitamin D. On feeding animals this diet, he found calcification and development of teeth in the jaw bone going on satisfactorily. From these experiments, he came to the conclusion that a proper proportion of calcium and phosphorus is more essential to the perfect development of teeth, although vitamins A and D are also very important for the deposition of calcium in the tissues.

Dr. Yamagami fed animals a diet with a certain amount of sugar and found changes in the hard dental tissues which included structural and tissue defects of enamel and the presence of a softened layer of dentin which might be stained with pigments. He ascribes these changes in the tissues to blood acidosis and calls it "caries acidosa." At the same time, he found that the enamel becomes very porous, to which condition he gives the name of "adamantinoporose." He found that, in the animals experimented on, the investing dental tissues underwent changes resembling in character those associated with pyorrhea alveolaris. In further experiments, in which animals were injected with lead sugar, he found the same kind of changes in the teeth as in the animals fed with ordinary sugar. He described this as lead poisoning caused by blood acidosis. Drs. Yamagami and Ishino, in joint experiments in which they fed animals with an oversupply of proteins, found remarkable nutritional changes of tooth germs and carieslike structural changes in erupted permanent teeth. They ascribed these changes also to a kind of acidosis.

Contrary to the foregoing experiments, Dr. Shibata fed animals with a protein-free diet and demonstrated slightly imperfect calcification; whereas, with an oversupply of fat in the diet, no changes could be observed in the hard dental tissues, but the enamel organ and the soft dental tissues were subjected to fatty degenerative changes.

2. *Influence on the Teeth of the Endocrine and Other Organs and Various Substances Introduced into the Body.*—A second group of investigations largely concerned with the effects produced on developing teeth had to do with the presence of certain substances naturally or artificially introduced in the blood stream, or the absence of these substances. Studies of this sort were either experiments with the endocrines and other organs or experiments in which foreign substances were injected.

Dr. Ikuta carried on extensive experimental research by extirpating endocrine organs, reaching the conclusion that the

parathyroid, the thyroid and the suprarenal glands and the pituitary body have an accelerating influence in the formation of dental tissues belonging both to the epiblastic and mesoblastic layers, and to an equal extent. Among the endocrines, the parathyroid has the strongest and the pituitary body the weakest power. The thymus and the sex glands have an accelerating influence more on the mesoderm, and to a slightly greater extent than on the exoderm. The thyroid gland has an inhibitory influence on the formation of dental tissues belonging both to the epiderm and mesoderm layers.

As regards the influence of the ductless glands on the formation of dentin, Dr. Ikuta found that, for the deposition of calcium, the parathyroid has the greatest accelerating power. Next in order comes the thyroid, then the thymus, the suprarenals and the sex glands. The effect of the pituitary body is practically nil. The thyroid sometimes has an inhibitory action on deposition of calcium. The parathyroid has the greatest accelerating influence on the formation of the basic substance of dentin. The thyroid has the next greatest, then the thymus, suprarenal and the sex glands, and, least of all, the pituitary body. The accelerating influence of the parathyroid and the thyroid is exerted more on the deposition of calcium than on the formation of basic substances. The pituitary body has an accelerating power only on the formation of basic substances. The thymus, the suprarenals and the sex glands exercise an accelerating action on the two processes almost equally.

Dr. Masuda extirpated the kidney of animals and caused a complete defect or partial decrease in the function of the organ. In this way he could produce formative disturbances in teeth, absorption and atrophy of alveolar bone, gingivitis and pericementitis.

Dr. Ikuta made a biliary fistula and prolonged the life of animals by supplying water. He found that the lack of biliary secretions causes imperfect development of teeth, and atrophy and osteoporosis of the maxillae. This may be seen to be due to a lack of organic salts and vitamins through biliary secretion. At the same time, it may be ascribed to the disturbance due to lack of body fluids. He arrived at this conclusion on finding that the life of the animals could be prolonged by supplying fluids, such as water, externally, and thereby lessening the disturbances in dental tissues.

Dr. Imamura made experiments in animals in which he dissected and removed the supracervical ganglion of the vagus nerve. Through this operation, eruption of the teeth was accelerated or retarded; but he believes that the vagus nerve exercises no direct control on the growth of teeth, though it has a certain relation in influencing indirectly through nutrition the nerves of the teeth.

Dr. Ito injected arsaminol into animals and extracted the teeth. After removing the soft tissues, he crushed the teeth and proved the existence of arsenic in the hard dental tissues. Again, he injected typhoid vaccine, then extracted the teeth, crushed them and demonstrated a positive agglutination reaction on the filtrate.

Regarding the influence on the dental and investing tissues of inorganic elements introduced into the body, Drs. Masaki and Ishida reported on lead poisoning, Dr. Nagao, on yellow phosphorus poisoning and Dr. Miyoshi on bismuth poisoning, describing changes occurring in the tissues.

Dr. Imamura made a study on animals that died from an oversupply of water. He found atrophy of the formative organs of the teeth, developmental disturbance of the teeth, gingivitis and atrophy of the alveolus. At the same time, carieslike

defects and changes at the occlusal surfaces were also observed. He gave the condition the designation "water intoxicated teeth," and he supposed that this was due to lack of salts in the various internal organs and improper balance of water and salts in the tissues of the teeth themselves.

3. *Mottled Teeth.*—Finally, among the studies of developmental effects, there have been several investigations of mottled enamel among people in the Japanese domain.

Mottled teeth are reported to be widely prevalent in west Japan. Through the investigation of Drs. Tomitori, Nagamine, and Masaki, it has been found that this abnormality is scattered among villages between lime hills, in rocky districts, and also in the districts of mineral and hot springs. The shape or form and staining are different in different regions of the country. Caries is always infrequent in the mottled teeth districts. In the South Sea Islands, this abnormality may be found where there are phosphatic deposits. In Toyobie Islands, 90 per cent of the population suffer from mottled teeth, but they have no caries. The prevalence of mottled teeth in Japan proper is variable in different localities. In certain towns, all elementary school children suffer. In Hyogo Prefecture, a district surrounding a famous hot spring and along the riverside, the inhabitants suffer to the extent of 33 per cent. The governor of that prefecture called for an investigation for the prevention of this abnormality in 1931.

The etiology of this abnormality is not yet clearly understood. It is said to have a certain relationship to the quality and nature of the water supply. Lately, Dr. Kaku denied the endemic character of this abnormality; and, on conducting animal research, he concluded that this condition is produced by local disturbances and that particularly inflammatory conditions of the periapical region of the milk teeth have the most serious influence.

4. *Etiology of Dental Caries.*—Caries, of course, has been principally considered among the influences to which the teeth are subject after eruption. The studies of caries have been concerned with the etiology and with the incidence of tooth decay among Japanese.

Regarding bacteria of caries, Drs. Okumura and Nakai published their investigations in 1920 for the first time. These investigators continued their study and claimed that two kinds of bacteria play the most important part in the production of caries, *B. odontodecalcificans* and *B. odontolysogenis.* The former is very active in acid formation, producing decalcification of hard dental tissues and invading and dilating dentinal tubules. The latter, which is very active in gelatine liquefaction, produces fusing of the dentinal tubules and formation of caverns in the decalcified dentin. This phenomenon was proved through artificial caries caused by inoculation of a pure culture of these bacteria into the teeth.

Dr. Nakai classified *Bacillus odontodecalcificans* into four types, according to their power of causing decomposition or nondecomposition of dextrin and mannitose. Dr. Hasegawa tried immunologic tests on the bacteria, which formed three types of colonies, smooth, rough and medium. Not being able to prove any further differentiation, he concluded that though the colonies are different, the bacteria are one and the same.

Dr. Nakai made an investigation as to the products of decomposition of dextrose by *B. odontodecalcificans* by means of mixed fusing and fusing point estimation of the crystals of the nonvolatile acid produced. He came to the conclusion that the nonvolatile acid was produced far more in quantity than the volatile acid,

up to 30 times and that this nonvolatile acid was succinic acid. He also found this acid to be the principal factor in the decomposition products of the saliva and bread, and saliva and starch mixtures.

Recently, the relation between acid-forming bacteria in the mouth, intestine and vagina, aroused a keen interest in their similarity in structure and biological characteristics. In 1927, Dr. Katsuno published his study asserting that *Bacillus lactis* which he isolated from the mouth of the new-born infant and the feces of the milk-fed infant, and *Bacillus vaginalis* of Döderlein, which were isolated from mature women, are the same kind of bacteria; i.e., at the time of birth, the bacillus of Döderlein enters the baby's mouth, then passes into the intestinal canal, and there proliferates. These bacilli exercise an important influence in the normal healthy activities of the body and its maintenance. But in the mouth, the bacteria produce pathologic changes such as dental caries, because there exists in the mouth a decalcifiable substance such as enamel.

Dr. Sugiyama lately made an extensive study of the biologic character of *B. odontolysogenis,* dividing it into four types according to its habits, such as the decomposition and nondecomposition of solvits, dulcin and raffinose. Morphologically, the bacterium is quite similar to *B. coli,* but quite different in its immunologic relations.

Dr. Okumura made an investigation on the local influence of food and drink on the teeth. He classified their properties as follows:

1. Those tending to induce caries:

(*a*) Acid fermenting (indirect-decalcifying) property.

(*b*) Lodging property.

(*c*) Direct decalcifying property.

2. Those tending to prevent caries.

(*a*) Diluting property.

(*b*) Neutralizing property.

(*c*) Protective property (of animal and vegetable fats).

(*d*) Direct cleansing (through the stimulation of oral secretions) property.

(*e*) Indirect cleansing (through rubbing the tooth surfaces) property.

He examined the relative quantity of acid formation (acid fermenting property) in the food and drinks taken by the Japanese and found that various kinds of beans such as soya, Indiana, straight and French produce the largest quantity of acid; i.e., with a mixture of 4 c.c. of saliva to 5 gm. of foodstuff, producing at most 1.24 per cent in twenty-four hours, and 2.78 per cent in seventy-two hours.

Dr. Sato made an investigation as to the physiochemical properties of human saliva and reported that differences between caries-immune and caries-susceptible persons are not definite. Only the following may be considered as established:

1. The specific gravity is a little higher in immune persons than in susceptible. 2. The p_H value is a little higher in the immune than in the susceptible. 3. The calcium content is higher in the immune than in the susceptible. 4. The glucose content is less in the immune than in the susceptible, but the starch digestion coefficient is greater in the immune. 5. The content of rhodan salts has an intimate relation with tobacco. Employees in tobacco factories have more rhodan in the saliva. 6. In employes of candy factories, the p_H value is lower than in those of other factories.

5. *Prevalence of Caries.* — Dr. Kawakami reported that, in Tokyo, 98.3 per cent of children just entering elementary school suffered from carious teeth; 57.4 per cent of the milk teeth suffering on an average, and 22.9 per cent of the permanent teeth, the latter mostly the first molars.

In other reports, it was found that elementary school children in the central district of Tokyo suffered to the extent of 95.62 per cent, while children of the poorer classes suffered to the extent of 86.8 per cent. In the country parts of southern Japan, 79.04 per cent of elementary school children were found to have the same complaint.

In Tokyo, "middle school" boys suffered to the extent of 90.1 per cent, and, in north Japan, the soldiers in an infantry regiment suffered to the extent of 94.39 per cent.

With regard to the first molar, various kinds of surveys were made, as these teeth were considered the most important ones in the health of the children. Dr. Okamoto reported that, in Tokyo, 77.3 per cent of elementary school children have carious first molars. Of the sixth grade students, 86.4 per cent were found to have caries. The lowest percentage was in the first grade, 51.3 per cent of the total number. Among those children, on an average, 18.3 per cent suffered from third degree caries, i.e., pulp inflammation; and an average of 6.8 per cent from fourth degree caries, i.e., destruction of the whole crown.

Dr. Harasawa reported that elementary school children of the poor classes in Tokyo suffered from caries of the first molars to the extent of 65.9 per cent, on the average, about 11 per cent less than children of the higher classes. Even though a temporary and palliative treatment was given to the affected teeth, it was found, after one year, that the number of children suffering was 8.7 per cent more than before. At the original survey, 36.9 per cent of the whole number of the teeth possessed by the children were found to be carious; while, at the second survey, 50.1 per cent were found to be carious, an increase of 13.2 per cent. She also added that 9.9 per cent of the carious teeth have shown certain progress during the interval.

As to racial classifications, various reports have been published by various authors. Dr. Boots reports that, in Korean people, about 40 to 50 per cent on an average suffer from caries, while, in mountainous districts, the average is 30 per cent. This lower percentage may be attributed to the food habits. The native Koreans take less sugar and more salt. They are used to taking abundant quantities of a salt-pickle of vegetables, meat and fish. In elementary school children of Korean cities, sufferers increased to 52 per cent, and in those Koreans who are employed in the families of white people, to 84 per cent.

Dr. Shirai reported that the Taial tribe in Formosa suffer from carious teeth to the extent of 52.5 per cent. They take no sugar, little salt and very small quantities of honey. Dr. Yokochi reported that in the Ami tribe (age 8-15 years) in Formosa, 22.5 per cent suffer from carious teeth. On the whole, 3.9 per cent of the children are found to have carious first molars, and 1.4 per cent of the number of erupted first molars are found carious. They take fibrous and hard food and little cake. The development of teeth is good, but the arrangement often very irregular. Mouths are very dirty.

Drs. Ito and Nakamura reported that the Ainu tribe have carious teeth to the extent of 42.18 per cent on the average. And in those villages where they keep to their original food habits, on the average 48 per cent suffer, when no sugar and very little salt are taken, and large quantities of alcohol and fats are used; and those who have the same food habits as the Japanese suffer to the extent of 50 to 72 per cent on the average. Drs. Shimamine and Kanamori reported that the pure Ainu tribe suffer to the extent of 61.3 per cent.

Dr. Masaki made an extensive survey of the inhabitants of the South Sea Islands (under Japanese mandate) and found there are two different tribes. In the Kanaka tribe, widely scattered among the Hawaiian and other Pacific Islands, elementary school children suffer to the extent of 7.4 per cent on the average. Individual averages range from 2.5 to 10.8 per cent.

In the Palau and Yap Islands, the Kanaka tribe have a betel-chewing habit and suffer only less than those without that habit. Dr. Masaki made a survey of carious teeth of mature Islanders in Palau and found only one suffering among thirty-six. In Yap, of 115 children, only three were affected.

Dr. Ohashi examined the teeth stained by betel chewing in Formosa and found 5.5 per cent of persons suffering among the whole number examined. Abrasion and gingival recession were remarkable. Dr. Masaki reported that those who practice betel chewing in the South Sea Islands possess very clean mouths, but alveolar atrophy also is found in them. Another tribe in the South Sea Islands is the Chammorro tribe, who have Spanish and Mexican food habits. They suffer more from carious teeth than do the Kanaka tribe. The school children in the various islands suffer from caries to the extent of 36.4 per cent for the entire group and from 32.8 to 40 per cent in the islands individually.

Dr. Suzuki, in a survey of the Japanese and Chinese living in Chientao, found that the former suffer to the extent of 79 per cent and the latter to the extent of 39 per cent. At the age of 9, 91 per cent of the former and 66 per cent of the latter suffer. At the age of 11, 63 per cent of the former suffer, and 28 per cent of the latter. At the age of 25, 87 per cent of the former, and 28 per cent of the latter are afflicted. He considered this lower frequency among the Chinese to be due to their taking only a small amount of sugar, much fruit and water with a high calcium content.

Studies of the relations of the teeth to the body as a whole and to its health have included the relation of mastication to health, biologic relations of the teeth and systemic infections arising from oral conditions.

6. *Impairment of Health Due to Caries and Malocclusion of the Teeth.*— Several investigators have found important detrimental effects of imperfect mastication due to caries and malocclusion.

According to Dr. Hara, digestion and absorption of foodstuffs vary according to the degree of mastication.

He made investigations on young men at the age of 20, having good strong teeth. With imperfect mastication, digestion and absorption of food were found to be decreased in the following percentages: as compared to perfect mastication by the same youths, nitrogenous compounds were reduced 13 per cent; proteins, 14 per cent; fat, 10 per cent; carbohydrates, 1 per cent; coarse fiber, 40 per cent.

In patients having defective teeth treated and replaced, digestion and absorption of food increased in the following percentages: coarse protein, 6.4 per cent; coarse fat, 3.1 per cent; carbohydrate, 3 per cent; coarse fiber, 37.6 per cent.

Variation of masticating force according to condition of teeth was estimated and reported by Drs. Okada and Tomitori. They classified middle school boys aged 13-14 into three classes, A, B and C, according to the condition of teeth, occlusion and cleanliness of the mouth. On the right side, Class A, in the first molar region, showed a masticating force on the average of 55.4 kg.; Class B, 35.4 kg., Class C, 10.5 kg. On the left side,

it was generally less than on the right side. In the anterior region, the masticating force was, for Class A, 24.4; for Class B, 14.8, and for Class C, 10.3.

As to the relation between the general constitution and the force of mastication, Drs. Okada and Tomitori made estimations on boys aged 9. In the healthy boys, the force of mastication in the right first molar region was found to be 34.1 kg. on the average; while, in the weak ones, it was 27.5 kg. in the same region.

Dr. Takahaski made an extensive survey on elementary school children, more than 16,000 in number, and reported that 11 per cent of the number that possessed sound teeth were found to have imperfect nutrition. Sixteen per cent of the total number possessed carious teeth (more than three cavities or one stump), and 24 per cent had malocclusion.

Nine per cent of the boys who had sound teeth were found to be in poor general health; 12 per cent of the boys had carious teeth, and 27 per cent had malocclusion.

This estimate means that malocclusion tends to induce malnutrition and ill health.

7. *Biologic Studies of Teeth.*—Various investigations recently undertaken may be classified as biologic studies, as they are largely concerned with the general character of the teeth in relation to the whole body—considerations which may bear on the explanation of systemic infections from the teeth.

Dr. Fukushima made a series of serologic investigations on various mammals and fishes, demonstrating that the pulp of these animals possesses an "organ specificity," and, therefore, that the pulp is an independent organ.

Dr. Masaki injected immunologic serum or emulsion of the pulp, and found that certain pathologic changes were produced in the pulp tissue. He called the cell poison which acts on the same kind of the cells, "pulpotoxin." He called attention to the fact that this poison acts on the allied organs: stomach, liver and lungs. He concluded that the pulp has a comparative organ specificity.

Dr. Shibata gave dental papilla and cells of the enamel organ to animals extra-orally and, through histologic and biologic study, he demonstrated their effect on the interchange and eruption of teeth and on the formation of new dentin. He proved also that pulp cells and cells of the enamel organ possess self-controlling power.

Dr. Yumikura cultivated roots of rabbit teeth in blood plasma and found that the highly specialized cells rapidly undergo degeneration; especially are the odontoblasts most sensitive, cylindrical enamel epithelium coming next. Those cells which are not highly specialized—for example, squamous inner enamel epithelium, round odontoblasts at the apex of the root and outer enamel epithelium—undergo profound proliferation. Connective tissue cells also proliferate very rapidly, while epithelial cells grow independently of connective tissue, without any mutual connection whatsoever.

Dr. Yagi recently made an artificial cultivation of rabbit pulp. He prepared a fresh section about 1 mm. square, immersed in "heparin plasma" to which was added a drop of highly compressed splenic juice as a growth accelerating factor. After twenty-four hours, the cells of the pulp began to proliferate, attaining maximum growth in four or five days. The section is found to attain the size of more than ten times the original, under the microscope giving the appearance of a pure culture of pulp cells. The odontoblasts were not included in the section.

8. *Infection Through Teeth.*—Recent investigations have also dealt directly with the problem of focal infection as

far as the oral organs are concerned.

Dr. Nakai made a study to determine whether an antigen could be absorbed through dentin. He excavated cavities on the occlusal surfaces of dogs' molar teeth and inoculated them with a condensed filtrate of bouillon culture of cholera bacilli, and proved the formation of antibodies in the serum. Further, he made a test of human teeth in which the carious process was limited to only the superficial layer of dentin; i.e., the pulp was in normal condition. After excavating and making clean the decayed dentin, he inoculated the cavity with the same antigen as before described, for five successive days, and the patient felt pain, the bodily temperature was increased and antibodies were found in the serum.

Dr. Ushikubo applied typhoid vaccine to the pulp and proved immunologic reaction in the serum.

Dr. Shirasu made a study to find whether the tuberculous bacillus penetrates pulp tissue. He applied a culture suspension of that bacterium on the pulp of animals and sealed it in for fifty days. On examining the tissues, he concluded that the pulp undergoes no pathologic change whatsoever. He hence decided that this tissue itself is immune to that disease, but may transmit the bacteria to the deeper tissues. This supposition was confirmed by an experimentation on a culture of *Bacillus tuberculosis* injected into the heart. In that case, general miliary tuberculosis was produced, but the teeth themselves showed no changes. He also demonstrated that infection of the bacteria through the gum tissues caused a remarkable change in the investing dental tissues.

Dr. Nishizuka applied pure culture of the tuberculous bacillus to a dog's pulp and sealed the cavity for a certain length of time. On dissection, he found that the dental and periapical tissues showed no changes. The maxillary bone presented inflammatory changes, with no tuberculous affection; but the submaxillary lymph glands showed remarkable tuberculous changes. The glands suffered experimentally to the extent of about 9.5 per cent.

Dr. Hosomi instilled a culture of tuberculous bacillus into the palatine tonsils; and, taking a certain amount of blood from the right chamber of the heart, injected it subcutaneously into the abdominal wall of the animals, proving the presence of tuberculous changes in the lungs, spleen, liver and lymph glands, but not of noticeable changes in the tonsils themselves.

Dr. Sano made a classification of bacteria which infect the putrescent canal and claimed that streptococci and streptobacilli were predominant, the former belonging to *Streptococcus lactis* or *Streptococcus viridans,* and the latter to the *Bacillus lactis* type.

Lately, Dr. Yamamoto recognized that *Streptococcus viridans* could be transformed into *Enterococcus viridans.* The *Enterococcus viridans* can be found abundantly in the mouth of pyorrheal patients. In the mouth of carious patients, the bacteria can be found more plentifully than in the mouth of caries-free subjects. For the isolation of that bacterium, he recommended esculin blood-agar as a medium. In this way, *Streptococcus viridans* and *Streptococcus hemolyticus* could be discriminated from *Enterococcus viridans* and *Enterococcus hemolyticus.*

Recently, oral surgeons in Japan have reported an unexpected number of cases of oral actinomycosis, and also assert that actinomycosis in other organs may be traced frequently to actinomycosis in the oral region.

Dr. Fujimasa isolated and cultivated actinomyces from the oral region and said

that the structure of the bacteria is very unstable, and classification from the immunologic standpoint very difficult. He examined forty-nine strains of the oral actinomyces. All of them were of the anaerobic or Israel type. None of the aerobic or Bostroem type was isolated from the infected region. Immunologically, he found reactions of very high value, and he added that he is intending to establish a serodiagnosis of the disease.

Dr. Funiu isolated eighteen strains, among which twelve were of the Israel type, the six others being atypical in form.

Regarding the study of oral protozoology, Dr. Shigeura found that of 104 pyorrheal patients, 73 harbored *Endamœba gingivalis,* and forty-eight of 105 school children of an elementary school also had this parasite. Drs. Takemura and Kuwahara found 115 of 150 pyorrheal patients infected with the same endameba.

Dr. Shigeura tried a prolonged cultivation of *Trichomonas elongata* or *Trichomonas buccalis* and made clear its physicochemical properties. He showed that the same trichomonas inhabits an average of 10 per cent of the population of Tokyo.

Dr. Saitch made an investigation on *Filaria immitis* and reported that the larvae enter through the apical foramen along the small blood vessels, and proliferate abundantly in the root portion of the pulp, causing various kinds of changes, mostly hemorrhagic, in the coronal portion of the pulp.

9. *Fundamental Principle of Dental Hygiene.*—After careful consideration of various aspects of the dental hygiene problem, I formulated the following scheme as the fundamental principle to be observed for the promotion of the dental and oral health.

1. Utilization of the modifiability of the teeth and mouth: (*a*) modifiability of the teeth before eruption, i.e., stimulation of normal formation of dental tissues, through nutritional and other influences; (*b*) modifiability of the teeth after eruption, i.e., restoration of the structure of teeth to a normal condition, through prophylactic treatments; (*c*) modifiability of the mouth, i.e., restoration of the various structures in the mouth to perfect order, through prenatal, prophylactic, surgical and orthodontic measures.

2. Utilization of the movability of the teeth and the mouth: (*a*) movability of the teeth, i.e., stimulation of their normal development, through physiologic movement in the proper masticatory function; (*b*) movability of the mouth, i.e., maintenance of the various oral tissues in a normal condition, through the thorough movements of the mandible and muscular structure in mastication and other oral functions.

3. Utilization of the cleansability of the teeth and mouth, i.e., maintaining a sanitary condition of the teeth and mouth, through natural, artificial and operative measures. Items 1 and 2a, above, are to be included under "positive preventive measures" and aim to increase the resistance of dental tissues and oral organs to any injurious substances. Items 2b and 3 are to be included under "negative preventive measures" and aim to eliminate any substance which may be injurious to the tissues and organs.

THE PRESENT CONDITION OF PUBLIC DENTAL HYGIENE

The scope of the present Japanese dental health program and the means by which it is being put into operation may be gathered from the various activities and agencies, general and particular, of which some brief account is here given.

1. *Promotion of Dental Hygiene in General.*—(*a*) The sanitary and medical affairs of the nation are under the control of the Home Department. The Central Sanitary Bureau in the department su-

pervises all matters relating to hygienic and medical work. Besides, there is the Central Board of Health and the Investigation Board of Health and Hygiene, consisting of Government officials and professional authorities, including a dentist, as the advisory bodies. As regards hygiene and medical treatment for factory employes, the Social Affairs Bureau supervises it in consultation with the Investigating Board for Labor Insurance, members of which also include a dentist.

(*b*) The central organization of dental hygiene movement is the Japan Dental Association, which represents the whole body of dental societies and governs all the dentists throughout the country. The Japan Dental Association has its board of public dental education, which, in cooperation with the Section of Public Dental Education of the Prefectural Dental Societies, carries on propaganda for dental hygiene. In this activity, the Lion Oral Hygiene Institute, followed by the Nakayama Oral Hygiene Laboratory, is participating very effectively. Through the various posters and abundant printed matter, movie films, lectures of many itinerant dentists, exhibitions, broadcasts, etc., the public always has the advantage of opportunities of receiving dental health education.

(*c*) Recently, the oral hygiene movement has begun to centralize activities on the occasion of the "Dental Decay Prevention Day" and "Health Week." The former is held under the auspices of the Japan Dental Association, the latter under the Home Department, and both have proved very successful.

The Dental Decay Prevention Day, June 4, is observed every year throughout the country, being participated in by all the dental profession and backed by the Government offices concerned. Slogans such as "Take care of the milk teeth," "The teeth—the first line of health," "Guard your 6-year molars," "Good mastication with good teeth," have been adopted everywhere on that day.

Health Week is observed every year and the dental society is also the center of the activities in cooperation with the Government offices and public organizations.

2. *Dental Hygiene in Schools.*—(*a*) In 1900, the Government established the Section on School Hygiene in the Department of Education. This section, having undergone many changes, has now become the present Section of Physical Culture, by which all matters relating to school hygiene are supervised. The Investigation Board of School Hygiene acts as the advisory body and includes dentists as members. Although the School Hygiene Ordinance was established in 1898, the regulations providing for the appointment of school dentists were put into force only in 1925, in a few prefectures. Since that year, it has made rapid strides, and, in 1921, an imperial ordinance unifying the prefectural regulations was proclaimed, the status of the "school dentist" being recognized legally for the first time as on an equality with that of school physicians. The school dentist may be appointed for work in elementary, secondary and higher schools, universities, young men's training institutions, etc. The ordinance does not enforce the appointment of dentists for all schools in view of the insufficient number of dentists and the financial burden on the prefectures. The "kindergarten dentist" holds the same status as the school dentist.

(*b*) At present, dentists are usually provided for the elementary schools, and less commonly for the middle schools and girls' high schools. These school dentists are appointed by prefectural governors. They are on duty for certain fixed times

in the schools, as most of them are engaged in dental practice. Details of the work of school dentists are outlined by the prefectural governor, but it usually comprises: 1. Talks, lectures and instruction to school children and students and their parents. 2. Dental hygiene training, such as toothbrush drilling, which is most popular, and, in many prefectures, determining the details of the dental hygiene curriculum. 3. Periodical examination of the teeth and mouth the results being reported to parents. The form of the examination card is not yet nationally standardized, but that devised by the Japan Dental Association in collaboration with the school dentists' societies, which can be used for six years (in elementary schools) or five years (in middle schools) consecutively, is recommended. 4. Dental treatment, which is not yet unified in scope. Such treatments as the extraction of deciduous teeth and the filling of carious teeth not involving the pulp are given in the school clinics. Complicated treatments are conducted by dentists practicing outside the schools.

The dental treatment conducted at school is free of charge, and the public communities or the parents' societies bear the cost of treatment. In the case of the middle schools or higher schools, the scope of treatment is wider than that of the elementary schools, and treatment can be charged for.

In 1932, 3,169 elementary schools were provided with school dentists, and the number of school dentists aggregated 2,788. There are 744 school clinics, all of them in school buildings. There are no dental hygienists or nurses in Japan, but the number of school nurses is increasing year by year.

(*c*) There is an imperial school hygiene association for the advancement of school hygiene in Japan, and the Japan School Dentists' Federation has been established for the improvement of school dental hygiene, comprising the school dentists' societies throughout the country. These two organizations have their offices in the Department of Education, and hold a school dentists' convention every year under their joint auspices. A short course for the furtherance of study is given to the school dentist from time to time. A course in school dental hygiene for the teachers of elementary and middle schools is also frequently given at various places and with great success.

3. *Dental Hygiene Among Factory Employes.*—(*a*) The dental condition of factory employes in Japan was very bad until recently. In 1927, an oral inspection conducted among about 11,000 employes in the vicinity of Tokyo yielded the following figures: On the average, 1.22 teeth per employe require immediate treatment, 1.52 teeth being affected by pyorrhea alveolaris, 1.05 teeth needing to be filled, 0.81 teeth requiring extraction, 1.19 teeth calling for prosthetic work and 0.16 teeth requiring crowns or bridgework.

(*b*) In connection with the enforcement of the Health Insurance Law for factory employes, in January, 1927, the Japan Dental Association entered into an agreement with the Government relative to dental treatment of health-insured persons, and, since that time, most of the practicing dentists have been engaged in dental attendance as insurance dentists. During the six years from Jan. 1, 1927, to Dec. 31, 1932, dental attendance given to the persons insured by the Government may be classified as follows:

Teeth treated	2,873,189
Teeth filled	1,975,894
Teeth extracted	952,957
Teeth replaced	1,032,487

Total paid to insurance dentists by the Government through Japan Dental Association ..... 5, 568, 063 yen

Total paid to Japan Dental Association by the Government.....582, 246 yen

With regard to dental service to insured persons belonging to the health insurance societies with which the Japan Dental Association is also associated, the following figures show the returns for the past six years:

Teeth treated 542,373
Teeth filled 456,765
Teeth extracted 255,519
Teeth replaced 329,385

Total paid to insurance dentists.....
.....1,458,887 yen

Total paid to Japan Dental Association
.....274,781 yen

At present, the number of health-insured persons underwritten by the Government aggregates 1,122,900, and those underwritten by the health insurance societies which are allied with the Japan Dental Association, 357,500.

Although the extent of dental attendance to be granted insured persons includes all dental treatment, the examination of teeth, treatment by the dentist in the home and prosthetic work for less than seven teeth lost are excluded. Gold may be employed only in case of gold clasps and crowns for bicuspids and molars.

(*c*) In connection with the enforcement of the Accident Aid Law for Laborers in January, 1932, the Japan Dental Association has also entered into an agreement with the Government according to which, dental treatment of those laborers who are victims of accident in civil engineering and building construction work is to be given by the insurance dentists on the same terms, with a larger scope of treatment.

4. *Dental Hygiene in the Army and Navy.*—At present, in both the Army and the Navy, dentists are appointed as nonregular members of the staff. In the Army, there are twenty-one full-time dentists and fifty-eight part-time dentists each assigned to the garrison hospitals. In the Navy, there are nine full-time dentists assigned to the naval hospitals and squadrons. Recently, the necessity of establishing a system of appointing regular dental officers has begun to be keenly felt, and the Japan Dental Association has taken the matter up with the authorities concerned, to give impetus to the movement. The last sessions of the Imperial Diet took up the petition asking for establishment of dental surgeons in the Army and the Navy, and the House of Representatives passed the bill for their establishment. In the Army and Naval medical schools, a brief course in dentistry is given the students.

5. *Dental Relief Work.*—In connection with the enforcement of the Relief Law, effective Jan. 1, 1932, for the old and feeble, infants, pregnant women and invalids without support, the prefectural dental societies have entered into an agreement with the local communities relative to dental treatment of such persons to a certain extent. The Japan Dental Association also takes part in the relief work of the poor and sick in rural and fishing villages, giving encouragement to all prefectural dental societies and cooperating with the prefectural officials by setting up free dental clinics, by establishing visiting clinics in the rural districts and by distributing free treatment tickets among the poor.

TEACHING MOUTH HYGIENE IN SCHOOLS*

By C. CARROLL SMITH, D.D.S., Peoria, Ill.

THIS paper is to concern itself with the problem of presenting a program of dental health education in the public schools. It has two interdependent aspects: the subject matter to be included in such a program, and the method of presentation of that subject-matter. In an educational system wherein more and more emphasis is being placed on a study of effective technics of learning and teaching, and less and less on rigidly prescribed subject-matter to be mastered, a dental health program can find a significant place only if its presentation has been carefully planned to be an integral part of the child's total learning process. Hence, it is the aspect of presentation which will be considered first in this discussion.

The program of dental health education must first of all conform to the type of presentation of other educational material in the school system. The child at school becomes accustomed to certain technics of learning, and to call on him to use new ones is a distraction and a waste of time, both to him and to his teacher. These technics have been worked out by experts in the field of education as the most satisfactory ways of learning, and we of the dental profession must acquire a grasp of and sympathy with the educator's point of view before we can hope to be welcomed into his domain.

The modern educational process puts much emphasis on occupational work rather than formal study, especially in the early grades. Even in the later grades of the elementary school, correlation of occupational activity and study is considered the most desirable method of learning. Furthermore, presentation of all subject-matter must be developed psychologically, to suit the mental age of the child, and to demand of him only the knowledge and activity and degree of mental development of which his total experience has made him capable. It follows from these statements that elementary education depends for its effectiveness on repetition of subject-matter in two or three increasingly widening cycles during the eight years of elementary school, each cycle attacking the same subject-matter, but from a different point of view each time. A few examples of study pages from school readers and work-books for the various grades will show a practical application of these briefly stated principles in an ordinary school subject. "Flash" cards are an example of visual material employed in the learning process, especially in the very early grades.

The subject of dental health, to become a real part of the child's education, and even to find a recognized place in the school curriculum, must be presented in accordance with these principles, correlating with other school subjects and activities, and making use of visual and occupational material as a means to learning the subject-matter.

*Read before the Seventieth Annual Midwinter Clinic of the Chicago Dental Society, Feb. 28, 1934.

As to the subject-matter to be included in dental health education of the child, the question is principally one of selection. There should be no attempt at teaching professional knowledge or terminology. Such information would probably not be permanently retained in any case. The positive rather than the negative sides of the subject should be stressed, both because they are of more immediate practical value, and because they lend themselves more readily to the creation of interest. One of the chief faults of previous attempts at health education of any sort, and particularly dental health education, has been lack of interest for the child or the teacher, and failure to relate to the child's own experience. A program of dental health education should probably deal with the following aspects of the problem: (1) diet for sound teeth; (2) habits of cleanliness and care, which would include thorough drill in the use of the toothbrush, and (3) the elementary practical aspects of dental health knowledge which have a bearing on the smooth functioning of the whole physical mechanism, and which will enable the child as an adult to give intelligent attention to mouth conditions in himself and in the members of his family.

I have here with me a few examples of attempts at adapting dental health subject-matter to modern educational methods. I have chosen a first-grade project, to show to what simple terms, both in form and content, the material must be reduced. There is also a third-grade project, which will show how the same material is changed to meet the growing experience and ability of the child. An eighth-grade project shows how an older child can be encouraged to use more detailed information creatively, making the information his own by means of the creative process. These projects attempt to follow the criteria which have been stated previously in this paper, but they are by no means perfect from the educator's point of view. Mechanically, they fall short of being ideal educational material because of the limitations of the mimeograph. A child used to specially designed type adapted to his particular age finds the small type of the typewriter difficult to work with. And the artist who drew some of the pictures was not a person trained to understand a child's way of seeing, the result being pictures which appeal more to an adult than to a child. In content, the first-grade project probably demands too much from the child. It needs to be simplified still further. The eighth-grade project probably is a little too elaborate, demanding more than its proportionate share in an increasingly complex curriculum.

It is evident, then, that there is a practically untouched field for accomplishment in dental health education. The great need at present is for a good health reader, or series of readers which as yet has not been compiled satisfactorily from the point of view of both the educator and the physician and dentist. It should include all aspects of health, and should be so designed as to touch the occupational as well as the study aspects of learning. Its content and method should be adjusted to the rest of the school curriculum. Dental health would receive adequate treatment in proportion to the total content of the text. The language must be easily within the child's understanding and must appeal to him because of its adaptation to his every-day experiences and interests. It must be free from technical terms and professional details. A health textbook, like other modern school texts and project work-books, can be so written as to give supplementary reading material, information and project activity that will leave a definite store of knowledge and experience with the pupil,

at the same time maintaining an educational value that will make the book desirable as a part of the regular textbook purchases. Such a book, or series of books, to fill the need adequately, should be the compilation of a physician, a nurse, a dentist and a practical teacher.

Even with such a series of effective health books, the cooperation of the teacher is needed. The unwillingness of the ordinary teacher to cooperate in health programs makes it imperative that any program of dental health be completely and specifically prepared, with instructions and suggestions that will appeal to the teacher as well as the pupil. Such instruction should be supplemented with direct demonstration and suggestion from the dental health supervisor and his assistants. Much could be accomplished if definite instruction as to both the material and methods of dental health education could be included in normal training school courses. To gain an entrance into normal training schools, then, with a message and a program that will be specific enough to bring real results, is just another one of the problems that we must set for ourselves, if we are to take this whole question of dental health education in the public schools seriously.

In the absence of health textbooks, there is still a possibility of producing a practical program of dental health education among children in our schools, a program that may be well graded as to stages of pupil intelligence, and with subject-matter that will appeal to both teacher and pupil if it is intelligently selected and arranged. The requirements of such a program should include several typewriters with as many different sizes of type, an electric mimeograph, a good mimeoscope, plenty of stencils, art paper and mimeograph paper. One man, with a secretary, and a few meager supplies are not sufficient administrative arrangement to assure satisfactory results.

First of all, there must be a dentist in charge who understands what is involved in establishing a dental health education course. This director of activities must possess originality, determination, tactfulness and love for the work. He must be given sufficient personnel of the proper type, and must be allowed sufficient time and freedom to study the particular needs of the individual school system and the community in which it is located, in order that he may outline a health program that will measure up to and be equal in accomplishment with other extracurricular activities.

To arrive at a basis for organization, an outlined plan of the budget and the personnel necessary for carrying out an effective program of dental health education in the schools of a city of about 1,000,000 population is given in the accompanying table.

BUDGET AND PERSONNEL

Director, or supervisor, of the department	$ 8,000
Secretary	1,500
Assistant secretary	1,000
Statistician and consultant	1,800
Five dentists for dental inspection @ $2,500 each	12,500
Five woman assistants to these dentists @ $1,500 each	7,500
Five supervising teachers for class room activities @ $1,750 each	8,750
Educational material for class room use	6,000
Miscellaneous expenses	2,950
Total	$50,000

All of the appointees of this program should be carefully selected with regard to ability and fitness for this particular work. Mere political appointments, with no regard to peculiar adaptability to this important program, would be fatal to the outcome of the endeavor.

The two secretaries and statistician-consultant should not only be capable of doing good stenographic work, but should also possess business ability and a grasp of educational situations and be able to fit in to public school problems. Between them, there should be ability along the lines of English, composition, art, statistics, mathematical equations and pedagogics, and clerical intelligence. It is quite essential that these helpers be conversant with teacher and normal training school methods and be able to put in project form, suitable for the class room, the oral health ideas which the head of the department desires to incorporate in a graded series of lessons.

The five dentists will, in addition to their inspection and its tabulation, need to organize a follow-up system with their five woman assistants. These assistants, in addition to clerking for and assisting these men, will make calls in the homes to carry the dental health message where it seems necessary to secure cooperation and dispel ignorance. These assistants should be nurses or dental hygienists. Either title would carry authority that untrained or untitled assistants would not have. Each must have her own car.

The five supervising teachers must have had normal teacher training and possess ability and personality sufficient to deal with class room teachers and command their respect in presenting the problems or projects given out to be inculcated in the child mind. They should be able to teach the project as an example to the grade teacher in case she is at a loss as to method of procedure. These teachers will also need to have cars and will probably have need to carry considerable material with them.

The suggested budget for educational material may be small, but there may be compensation from the miscellaneous expense fund after the first year, when the equipment will have been purchased. The forms necessary for the inspections and all clerical needs will be no small item of the miscellaneous expense.

In the sixteen years that I have been with the Peoria schools, the dental health education methods have been varied. There has been a great deal of creative poster work as a result of various plans used to bring health information before the pupils. Stories, lectures, drills, dramas, the sand board, the stereopticon, motion picture films and other devices have been used to stimulate interest. The last plan provided a set of graded lessons, typewritten and mimeographed. With the aid of the art supervisor, every class room in the entire elementary grade system carried out these projects.

Our present educational plan has grown from small beginnings. It was some time before the plan became a unit of the whole. We first worked with those teachers who were willing and had a vision of the possibility of accomplishment along dental health lines. Gradually, the pleasure and profit in the work grew, and teachers not only finished the regular projects given them but asked for more.

A dental health education program in connection with any public school system is a factor in community betterment that will bring large returns in improved citizenship through raising the standard of physical fitness of the pupils in training.

I have just finished the annual inspection of the children in the kindergartens and first four grades of the Peoria schools. An analysis of the findings reveals that

27 per cent of the pupils examined had mouths in good condition, needing no present dental attention; 20 per cent were under the care of their own dentists with all service practically completed, and 16 per cent were having an opportunity for free service in the school dental dispensaries. The remaining 37 per cent were able to pay for service and were referred for attention to dentists of their own choice.

Further consideration of these four items brings to light that the sum of the first three items classes 63 per cent of those examined as coming under the benefits of dental health appreciation. The experiences of the past sixteen years make it safe to say that a very large percentage of these children will make their grades without trouble. Those failing in their grades will inevitably be found among the remaining 37 per cent, who have not shown appreciation of dental health opportunities. Of this 37 per cent, fully 15 per cent are newcomers to our school system from communities where no attention has been paid to mouth hygiene or health education. As a result of the inspections and notices sent home to parents, many of these will come to avail themselves of dental attention and thus lessen the possibility of their becoming repeaters.

To look back to the beginnings of the dental health activities in our community, there were comparatively few pupils under the care of their own dentists. It is some degree of satisfaction to note the steps in progress and see the results of more than twenty years of organized effort among our school children resulting in the establishment of clean mouth habits and increased mental efficiency, saving taxpayers' money in that fewer children repeat grades; as well as an awakened appreciation of dental service in the entire community.

It is desirable that facts be expressed in concrete figures, but it is as impossible to summarize the benefits of dental health activities in our schools in mathematical equations as it is to express numerically progress in art, music, manual training, domestic science or any other elementary subject included in a child's education.

It has been repeatedly proved that deplorable conditions in the mouth have definitely affected health and scholarship. After these defects were corrected and the mouths restored to health, the pupils' entire attitude toward their work changed for the better and the unfolding of educational processes improved poise, character, physique and endeavor.

If public school systems were as well organized in dental health matters as they are in other extracurricular activities, the world would be healthier and happier through children growing into better pupils, eventually making more useful citizens. Instructors specially prepared for this ideal and important task are needed to take their places with such supervisors and individual class room teachers of art, music, manual training, domestic science, physical education and other subjects so essential to education.

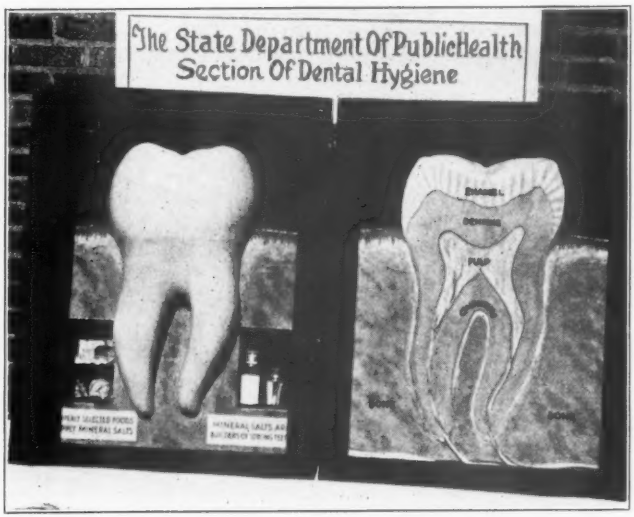


Exhibit portraying anatomic structure of tooth.

PERFECT JAW AT 4 YEARS OLD
PERFECT JAWS ARE NECESSARY FOR PERFECT TOOTH DEVELOPMENT
PERFECT JAW AT 6 YEARS OLD
SIX YEAR MOLARS ARE THE FOUNDATION FOR THE PERMANENT TEETH SAVE THEM FOR PERFECT DEVELOPMENT
DECAY SPREADS FROM BABY SET TO ADULT
NEGLECTED BABY TEETH MEAN IRREGULAR-MALFORMED-DECAYED PERMANENT TEETH HELP NATURE BY THE PROPER CARE OF BABY TEETH
PREMATURE LOSS OF BABY TEETH
EARLY LOSS MEANS CROOKED PERMANENT TEETH-IMPAIRED CHEWING-JAWS AND FACE UNDERDEVELOPED

Panels illustrating importance of deciduous teeth.

World's Fair Dental Exhibit

The two exhibits pictured on page 1291 were recently developed by the Mouth Hygiene Section of the Illinois State Department of Health. They are on display at the Chicago World's Fair, where they are attracting the attention of thousands of visitors each day.

The upper exhibit portrays the anatomic structure of a tooth and its relation to the gums and bone. By means of a controlled electrical flash system, the progress of decay beginning with its initial penetration of the enamel and ending with an abscess condition is shown. This exhibit also describes the minerals which are necessary for good tooth construction.

The lower exhibit consists of four panels illustrating the importance of deciduous teeth. These panels are illuminated by a controlled electrical flash system. They show the first permanent molar, the effect of decayed baby teeth on the adjacent permanent teeth and irregular eruption of permanent teeth due to premature loss of the baby teeth.

At the close of the Fair, both of these exhibits will be available to educational groups throughout the State.

Cavities in Deciduous Teeth

To the Editor:—What is the consensus among the best dentists about filling cavities in deciduous teeth? If this is not the accepted procedure, what is? Please omit name and address.—M.D., North Carolina.

Answer.—The constantly increasing demand for education on the part both of the public and of the dental profession has brought the problem of prevention of decay and all the ills that follow in its wake to a point at which the leaders in education agree that the whole solution centers on its early prevention.

Evidence is at hand that school children develop more rapidly both mentally and physically if their mouths and teeth are regularly under the care of the dentist.

The deciduous teeth should be retained until the permanent ones are ready to erupt, their roots being absorbed to accommodate them. If the deciduous teeth are taken out or are lost by decay before the permanent ones are ready to take their places, the arch becomes too narrow and irregularity follows. This can be corrected only by the orthodontist. The deciduous teeth should be filled as soon as decay appears. They should be kept clean by the systematic use of the toothbrush. If cavities in deciduous teeth are not filled, the child loses the use of the teeth, their pulps die, and abscess and destruction of the jaw bone follow. Adenitis results; even tuberculous germs may enter glands through cavities in the teeth. Digestion is impaired, the child suffers pain, and impairment of the health and of development follows. There is no sane argument for allowing deciduous teeth to decay. Cavities should be filled as soon as they occur. Children should visit their dentist at least every six months and oftener if necessary.

The consensus among the best dentists is that all deciduous teeth, when carious, should be filled and retained until the permanent ones are ready to take their places.—J.A.M.A., May 19, 1934.

Bird's-eye view of St. Paul, Minn. Center foreground: New Auditorium where the Seventy-Sixth Annual Session of the American Dental Association will convene, August 6-10.

AMERICAN DENTAL ASSOCIATION SEVENTY-SIXTH ANNUAL SESSION

ST. PAUL, MINN., AUG. 6, 7, 8, 9, 10, 1934

OFFICIAL CALL

To the Members of the American Dental Association:

You are hereby notified that the Seventy-Sixth Annual Session of the American Dental Association will be held at St. Paul, Minn., Aug. 6-10, 1934.

The House of Delegates will convene at 10:00 a. m., Monday, August 6; the second meeting will be held at 2:30 p. m., Monday, August 6; the third meeting at 2:30 p. m., Wednesday, August 8, and the fourth meeting at 2:30 p. m., Thursday, August 9. The four meetings of the House of Delegates will be held in the St. Paul Hotel. The Credentials Committee will register Delegates and Alternates, beginning at 10:00 a. m., Sunday, August 5, at the St. Paul Hotel.

All other members will register at the Registration Office in the St. Paul Auditorium. The Registration Department will be open from 9:00 a. m. to 5:00 p.m., Sunday, August 5, and from 8:30 a.m. to 5:00 p.m., Monday, Tuesday, Wednesday, Thursday and Friday, August 5, 6, 7, 8, 9 and 10.

The General Meeting which constitutes the opening exercises of the Session will be held Tuesday, August 7, at 9:30 a.m. The second and third General Meetings will be held on Tuesday and Wednesday, August 7 and 8, at 7:45 p. m. The three General Meetings will be held in the Auditorium Theater.

The constituent societies are hereby notified to file with the Secretary of this Association at least thirty (30) days prior to the first day of said Annual Session, a list of the names and addresses of their Delegates and Alternates.

ARTHUR C. WHERRY, *President,*
HARRY B. PINNEY, *Secretary.*

GENERAL PROGRAM

Registration (General) ..... Sunday, August 5, 9:00 a. m.
(St. Paul Auditorium)

Registration (Delegates and Alternates) ..... Sunday, August 5, 10:00 a. m.
(St. Paul Hotel)

Board of Trustees (First Meeting) ..... Friday, August 3, 9:00 a. m.
(St. Paul Hotel)

Board of Trustees (Second Meeting) ..... Friday, August 3, 2:00 p. m.
(St. Paul Hotel)

House of Delegates (First Meeting) ..... Monday, August 6, 10:00 a. m.
(St. Paul Hotel)

House of Delegates (Second Meeting) ..... Monday, August 6, 2:30 p. m.
(St. Paul Hotel)

House of Delegates (Third Meeting) ..... Wednesday, August 8, 2:30 p. m.
(St. Paul Hotel)

House of Delegates (Fourth Meeting ..... Thursday, August 9, 2:30 p. m.
(St. Paul Hotel)

PRELIMINARY PROGRAM FOR ST. PAUL SESSION

FIRST GENERAL MEETING
(Auditorium Theater)

TUESDAY, AUGUST 7

9:30 a.m. Music
Mr. C. A. Thornton, organist ..... St. Paul, Minn.

10:00 Invocation
Rev. Frank Zoubek ..... St. Paul, Minn.

10:05 Music
East Side American Legion Trio
Mrs. Edwin Amundson ..... St. Paul, Minn.
Miss Gladys Zachrison ..... St. Paul, Minn.
Mrs. Harry Johnson ..... St. Paul, Minn.
Miss Maude Nelson (accompanist) ..... St. Paul, Minn.

10:15 Greeting from the City of St. Paul
Hon. Frank B. Kellogg ..... St. Paul, Minn.
(Former Secretary of State)

10:30 Greetings from the St. Paul District Dental Society
A. F. Wolter, President ..... St. Paul, Minn.

10:35 Address of Welcome from the Minnesota State Dental Association
C. C. Sparrow, President ..... Minneapolis, Minn.

10:45 Response of the American Dental Association
C. J. Caraballo ..... Tampa, Fla.

11:00 Music
East Side American Legion Trio ..... St. Paul, Minn.

11:10 President's Address
Arthur C. Wherry.....Salt Lake City, Utah
11:30 Music
Mr. G. A. Thornton, organist.....St. Paul, Minn.

SECOND GENERAL MEETING

(Auditorium Theater)

TUESDAY, AUGUST 7, 1934

7:45 p. m. Music
Mr. G. A. Thornton, organist.....St. Paul, Minn.
8:00 Music (Solo)
Mrs. A. Gallagher.....St. Paul, Minn.
8:10 Address: "Pending Problems and Trends in Medical and Dental Economics"
Frederick C. Warnshuis, M.D.....Grand Rapids, Mich.
8:55 Music (Solo)
Mr. Grant Kelliher.....St. Paul, Minn.
9:00 Address: "The Need of Dental Consultation in Life Insurance Examination"
Boyd S. Gardner.....Rochester, Minn.
9:45 Music
Mr. G. A. Thornton, organist.....St. Paul, Minn.

THIRD GENERAL MEETING

(Auditorium Theater)

WEDNESDAY, AUGUST 8

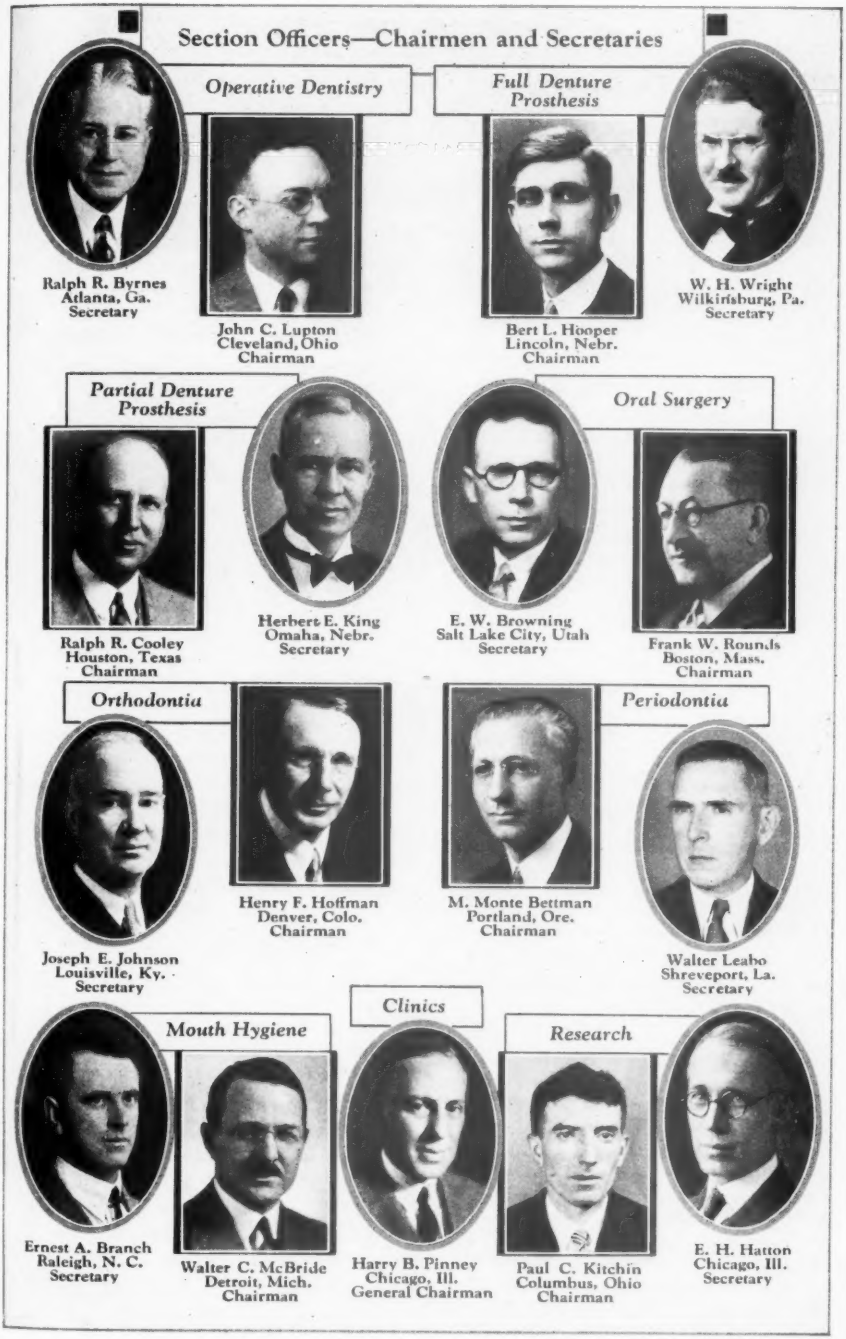
7:45 p. m. Music
Mr. G. A. Thornton, organist.....St. Paul, Minn.
8:00 Music
Orpheus Club
8:10 Address: "Diet and Nutrition as It Relates to Dental Caries"
E. V. McCollum.....Baltimore, Md.
8:55 Music
Orpheus Club.....St. Paul, Minn.
9:00 Address: "Interpretation of Proposed Legislation as It Applies to Health Service and the Practice of our Profession"
Sen. Henrik Shipstead.....Washington, D. C.
9:45 Music
Mr. G. A. Thornton, organist.....St. Paul, Minn.

FOURTH GENERAL MEETING

(Palm Room, St. Paul Hotel)

THURSDAY, AUGUST 9

10:00 p. m. President's Ball (Summer Formal)
In honor of the retiring President, Arthur C. Wherry.



CHAIRMEN AND SECRETARIES OF THE SCIENTIFIC SECTIONS OF THE AMERICAN DENTAL ASSOCIATION, 1934

THE SCIENTIFIC SECTIONS

TUESDAY, AUGUST 7

OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

(Lincoln Hall A, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

John C. Lupton, Chairman...Cleveland, Ohio
E. Bruce Clark, Vice Chairman.....Uniontown, Pa.
Ralph R. Byrnes, Secretary.....Atlanta, Ga.

2:30 to 5 p. m.

"Value of Routine Radiodontic Examinations"
By Clarence O. Simpson....St. Louis, Mo.
Discussed by
Vern D. Irwin.....Duluth, Minn.
Louis M. Cruttenden.....St. Paul, Minn.

"Rationalization of Dental Therapeutics and Materia Medica"
By U. Garfield Rickert.Ann Arbor, Mich.
Discussed by
Samuel M. Gordon.....Chicago, Ill.
J. R. Blayney.....Chicago, Ill.

"Present Trends in Operative Procedure and Their Possible Influence on Dental Education"
By Arthur T. Rowe.....New York City

FULL DENTURE PROSTHESIS

(Stem Hall, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

Bert L. Hooper, Chairman.....Lincoln, Nebr.
Harold L. Harris, Vice Chairman.....St. Paul, Minn.
Walter H. Wright, Secretary.....Wilkinsburg, Pa.

2 to 5 p. m.

"Problem of Establishing Centric Relation; Its Importance and Solution"
By I. Lester Furnas.....Cleveland, Ohio

"Immediate Duplicate Denture Service"
By Fred D. Miller.....Altoona, Pa.

"Surgical Problems as an Aid to More Efficient Service with Prosthetic Dentures"
By V. H. Kazanjian.....Boston, Mass.

"Practical Occlusion as Applied to Full Denture Construction"
By John B. LaDue.....Chicago, Ill.

PARTIAL DENTURE PROSTHESIS

(Theater stage, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

Ralph C. Cooley, Chairman...Houston, Texas
Theodore W. Maves, Vice Chairman.....Cleveland, Ohio
Herbert E. King, Secretary.....Omaha, Nebr.

2 to 5 p. m.

"Some Things We Should Not Do"
By George Wood Clapp..New York City

"Manipulation of Dental Porcelain"
By E. Bruce Clark.....Uniontown, Pa.

"The Embrasure-Saddle Clasp; Its Principle and Design"
By M. M. De Van.....Philadelphia, Pa.

ORAL SURGERY, EXODONTIA AND ANESTHESIA

(Auditorium Theater. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

Frank W. Rounds, Chairman...Boston, Mass.
Harry Bear, Vice Chairman...Richmond, Va.
E. W. Browning, Secretary.....Salt Lake City, Utah

2 to 5 p. m.

"Exodontia Relevant to the General Practitioner"
By A. P. Williams.....Louisville, Ky.

"Removal of the Mandibular Third Molar"
By George B. Winter.....St. Louis, Mo.

ORTHODONTIA

(Lincoln Hall B, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

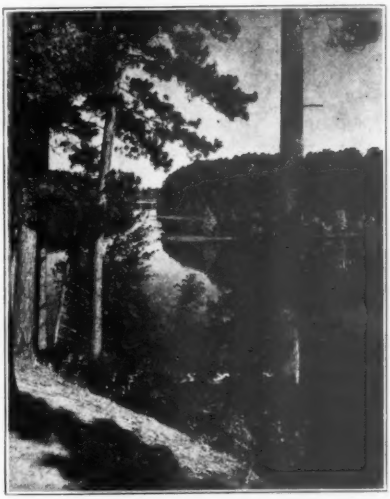
Henry F. Hoffman, Chairman..Denver, Colo.
O. W. Brandhorst, Vice Chairman.....St. Louis, Mo.
Joseph E. Johnson, Secretary..Louisville, Ky.

2 to 5 p. m.

"Trend of Orthodontics"
By Abram Hoffman.....Chicago, Ill.

"Complete Records: The Unseen Director in Orthodontic Practice"
By P. J. Murphy.....Dallas, Texas

"Economic Advantages to the General Practitioner from an Altruistic Concept of Orthodontics"
By R. H. Miller.....St. Louis, Mo.



Lake and woods near St. Paul.

PERIODONTIA

(Ramsey Hall A, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

M. Monte Bettman, Chairman..Portland, Ore.
Grace Rogers Spalding, Vice Chairman....
.....Birmingham, Mich.
Walter Leabo, Secretary.....Shreveport, La.

2:30 to 5 p. m.

"Importance of the Early Recognition and Treatment of Periodontoclasia"
By Robert L. Dement.....Atlanta, Ga.

"A Program for Postgraduate Instruction in Periodontia"
By Arthur H. Merritt.....New York City

"Subgingival Treatment in Oral Surgery"
By A. B. Vastine.....Bloomsburg, Pa.

MOUTH HYGIENE AND PREVENTIVE DENTISTRY

(Ramsey Hall B, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

Walter C. McBride, Chairman.Detroit, Mich.
L. W. Morrey, Vice Chairman...Chicago, Ill.
Ernest A. Branch, Secretary...Raleigh, N. C.

2:30 to 5 p. m.

Public Health Symposium

"State Public Health Program"
By N. Talley Ballou.....Richmond, Va.
Richard C. Leonard..Baltimore, Md.

"City Health Program"
By E. H. Jones.....Cincinnati, Ohio

"Community Health Program"
By Emory W. Morris.Battle Creek, Mich.

"Dental Health Education"
By C. J. Hollister.....Harrisburg, Pa.

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY, AND CHEMISTRY (RESEARCH)

(Mezzanine Foyer, St. Paul Auditorium. All subsequent meetings will be held in this room.)

OFFICERS OF SECTION

Paul C. Kitchin, Chairman..Columbus, Ohio
Rufus W. Leigh, Vice Chairman.....
.....Omaha, Nebr.
E. H. Hatton, Secretary.....Chicago, Ill.

2 to 5 p. m.

"Statistical Study of Caries of the Permanent and Deciduous Teeth in Children"
By J. T. Cohen.....Minneapolis, Minn.

"Prevention and Control of Dental Caries, an Institutional Study"
By C. L. Drain.....Iowa City, Iowa

"Eskimo and Indian Field Studies in Alaska and Canada on (*a*) Dental Caries; (*b*) Facial and Dental Deformities; (*c*) Lowered Defense for Disease, and (*d*) the Nature and Route of the Defensive Factors Through Nutrition"
By Weston A. Price.....Cleveland, Ohio

"Psychology of Pain Control"
By Elmer S. Best.....Minneapolis, Minn.

WEDNESDAY, AUGUST 8
OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

(Lincoln Hall A)

9:30 to 12 m.

"Fixed Bridges Cast in One Piece"
By Walter C. Shull....Kansas City, Mo.

Discussed by
Edouard M. Hall.....Kansas City, Mo.
J. J. Travis.....Ann Arbor, Mich.

Inlay Casting Technic Symposium

"Simplified Inlay Casting"
By Herbert D. Coy.....Hamburg, Iowa

"Controlled Casting"
By David W. Phillips.....Chicago, Ill.

"Controlled Hygroscopic Expansion of the Investment to Compensate for Shrinkage"
By C. H. Scheu.....Lakewood, Ohio

FULL DENTURE PROSTHESIS

(Stem Hall)

9 a. m. to 12 m.

"Spherical Occlusion; A Logical Deduction"
By C. W. Benson.....Duluth, Minn.

"Correction of Congenital Cleft Palate Speech by Appliances"
By J. J. FitzGibbon.....Holyoke, Mass.

"Roentgen-Ray Study of the Temporomandibular Articulation"
By Robert R. Gillis.....Hammond, Ind.

"Need of Research for Future Prosthetic Dentistry"
By Walter J. Pryor.....Cleveland, Ohio

PARTIAL DENTURE PROSTHESIS

(Theater Stage)

9 a. m. to 12 m.

"Dental Cripples; the High Cost of Dental Service and the Relation of These Cases to the Dental Profession"
By John S. Dohan.....Montreal, Canada

"Arrangement of Teeth with Respect to Leverage (Balanced Occlusion)"
By Rupert E. Hall.....Chicago, Ill.

"Stabilization of Partial Dentures"
By David W. McLean.Los Angeles, Calif.

"Tests of a Few of the Newer Denture Materials"
By Ronald Barber....Washington, D. C.

ORAL SURGERY, EXODONTIA AND ANESTHESIA

(Auditorium Theater)

9 a. m. to 12 m.

"Anesthetics and Their Side Actions"
By B. H. Harms.....Omaha, Nebr.

"Value of Physical Studies in the Diagnosis and Treatment of Lesions of the Mouth"
By Leroy M. S. Miner.....Boston, Mass.

"Oral Lesions Due to Hypersensitiveness"
By Virgil Loeb.....St. Louis, Mo.

ORTHODONTIA

(Lincoln Hall B)

9 a. m. to 12 m.

"Influence of Food upon the Jaws of the American Eskimo"
By L. M. Waugh.....New York City

"A Résumé of Etiologic Factors in Malocclusion"
By Walter L. Hyde..Minneapolis, Minn.

"Normal Development Changes to Be Expected in the Face of the Growing Child" (Illustrated by Motion Pictures)
By B. Holly Broadbent..Cleveland, Ohio

PERIODONTIA

(Ramsey Hall A)

9 a.m. to 12 m.

"A Method of Treating Periodontal Disease"
By W. H. Scherer.....Houston, Texas

"The Individual Missing Tooth—Its Ill Effect on Dental and Periodontal Health"
By Isador Hirschfeld....New York City

"Relationship of Dentistry to Medicine"
By Edgar V. Allen (M.D.).....
.....Rochester, Minn.

MOUTH HYGIENE AND PREVENTIVE DENTISTRY

(Ramsey Hall B)

9 a. m. to 12 m.

"Conductive Anesthesia for Children"
By Joseph B. Sherman.....Chicago, Ill.

"Ethyl Chloride for Children"
By L. N. Ellsworth.....
.....Salt Lake City, Utah

"Dental Roentgenography for the Child Patient"
By Walter S. Thompson.....
.....Los Angeles, Calif.

"Incipient Orthodontic Needs"
By Henry F. Hoffman.....Denver, Colo.

"Lessons to Be Learned in a Children's Dental Clinic"
By John O. McCall.....New York City

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)

(Mezzanine Foyer)

9 a. m. to 12 m.

"Chemical Study of Human Saliva Indicating That Ammonia Is an Immunizing Factor in Dental Caries"
By C. J. Grove
C. T. Grove.....St. Paul, Minn.

"Dental Morphology and Pathology of Pre-Spanish Peru"
By Rufus W. Leigh...Fort Omaha, Nebr.

"Postnatal Development and Calcification of Human Upper and Lower Anterior Permanent Teeth"
By Rudolf Kronfeld.....Chicago, Ill.

"Fungus Infection in the Oral Cavity"
By T. A. Hardgrove...Fond du Lac, Wis.

OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

(Lincoln Hall A)

2:30 to 5 p. m.

"Applications of the Rubber Dam"
By O. A. Anderson.....Seattle, Wash.

"Use and Abuse of Synthetic Fillings"
By Malvern Dumah Huff...Atlanta, Ga.

Discussed by
R. C. Seibert.....St. Louis, Mo.

"Diet and Dental Caries"
By Russell W. Bunting. Ann Arbor, Mich.

Discussed by
T. J. Hill.....Cleveland, Ohio
Edward H. Hatton.....Chicago, Ill.

FULL DENTURE PROSTHESIS

(Stem Hall)

2 to 5 p. m.

"Are Anatomic Teeth Suited for Full Dentures?"
By George P. Phillips.....Boston, Mass.

"Prosthodontist's Interest in Mineralization and Demineralization of Bone"
By Boyd S. Gardner....Rochester, Minn.

"Fundamental Principles in the Correction of Occlusal Disharmony, Natural or Artificial"
By Clyde H. Schuyler....New York City

"Practical Bioengineering in Full Denture Construction"
By Arthur P. Little.....Richmond, Va.

PARTIAL DENTURE PROSTHESIS

(Theater Stage)

2 to 5 p. m.

"Crown and Bridge Technic Showing Corrective Cases of Subarthrosis and Dysarthrosis by Repositioning of the Mandible"
By T. V. Maves.....Cleveland, Ohio

"Food Identification"
By Arthur L. Walters.....Tulsa, Okla.

"A Hop, a Skip and a Jump"
By Horace G. Whittlesey.....
.....Mexico City, Mexico

ORAL SURGERY, EXODONTIA AND ANESTHESIA

(Auditorium Theater)

2 to 5 p. m.

"The Rôle of the Push-Back Operation in Cleft Palate Surgery"
By G. M. Dorrance (M.D.).....
.....Philadelphia, Pa.

"Osteomyelitis of the Mandible"
By Thomas Conner.....Atlanta, Ga.

"Regional Block Anesthesia; Certain Phases of Its Administration"
By Howard C. Miller.....Chicago, Ill.

ORTHODONTIA

(Lincoln Hall B)

2 to 5 p. m.

"The Roentgenogram, a Guide in Children's Dentistry"
By L. R. Main.....St. Louis, Mo.

"Important Diagnostic Considerations Prior to Orthodontic Treatment"
By A. C. Rohde.....Milwaukee ,Wis.

"Children's Dentistry in Relation to Prevention of Dental Anomalies"
By George E. Morgan..Milwaukee, Wis.

PERIODONTIA

(Ramsey Hall A)

2 to 5 p. m.

"Periodontia Treatment for Maximum Reattachment"
By H. J. Leonard.....New York City

"Surgical Eradication of Infected Paradentium"
By A. W. Ward....San Francisco, Calif.

"Subgingival Curettage in Periodontoclasia"
By Arvah S. Hopkins....Gulfport, Miss.

MOUTH HYGIENE AND PREVENTIVE DENTISTRY
(Ramsey Hall B)
2 to 5 p. m.

"Preoperative and Postoperative Pedodontic Considerations"
By John C. Brauer.....Lincoln, Nebr.
"Treatment and Maintenance of Nonvital Deciduous Teeth"
By Charles A. Sweet.....Oakland, Calif.
"Extraction of Nonvital Deciduous Teeth"
By Thomas R. Abbott...Milwaukee, Wis.
"Résumé of Papers on Nonvital Deciduous Teeth"
By John E. Gurley..San Francisco, Calif.
General Discussion

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)
(Mezzanine Foyer)
2 to 5 p. m.

"Development of Sclerosis of the Dentin"
By Theodore B. Beust....Louisville, Ky.
"Physiology of the Rat Incisor and Its Characteristic Reaction to Certain Systemic Changes"
By Isaac Schour.....Chicago, Ill.
Sherwood R. Steadman.....
.....St. Paul, Minn.
"Roentgen-Ray Densitometric Measurements of Chromophobic and Chromophilic Areas in Dentin"
By G. Van Huysen.....Rochester, N. Y.
"Studies of the Fusiform Organism"
By Myron S. Aisenberg...Baltimore, Md.
"Inhibition of Lactobacillus Acidophilus by the Saliva"
By O. W. Clough.....Rochester, N. Y.

THURSDAY, AUGUST 9
OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS
(Lincoln Hall A)
9 a. m. to 12 m.

Cooperative Dental Research between the National Bureau of Standards and the American Dental Association
"Zinc Phosphate Cements, Physical Properties and a Specification"
By George C. Paffenbarger.....
.....Washington, D. C.
W. T. Sweeney...Washington, D. C.
"Physical Properties of Certified Amalgam Alloys (A Preliminary Report on the Silicate Cements)"
By William H. Crawford.New York City
"Consideration of Some of the Fallacies Associated with the Administration of Local Anesthetics"
By Edward Reiter.....Cleveland, Ohio

FULL DENTURE PROSTHESIS
(Stem Hall)
9 a. m. to 12 m.

"Comparative Values of Modern Denture Materials"
By J. B. Hathorn..Wichita Falls, Texas
"A Simplified and Improved Full Denture Technic"
Wilfred H. Terrell.....Pasadena, Calif.
"Color in Relation to Denture Esthetics"
By Elbert B. Owen.....St. Louis, Mo.

PARTIAL DENTURE PROSTHESIS
(Theater Stage)
9 a. m. to 12 m.

"Partial Denture Construction and Its Relation to Preventive Dental Medicine"
By M. Francis Wielage.....Miami, Fla.
Symposium on Practical Partial Denture Prosthesis
"Fixed Partial Dentures (Crown and Bridge)"
By Stanley D. Tylman.....Chicago, Ill.
"Removable Partial Dentures"
By F. C. Elliott.....Houston, Texas

ORAL SURGERY, EXODONTIA AND ANESTHESIA
(Auditorium Theater)
9 a. m. to 12 m.

"Foreign Bodies of Dental Origin in Air and Food Passages"
By D. G. Gardiner (M.D.).....
.....St. Paul, Minn.
"Elective Localization and Cataphoresis of Streptococci"
By E. C. Rosenow.....Rochester, Minn.
"Fractures of the Jaws"
By C. W. Waldron..Minneapolis, Minn.

ORTHODONTIA
(Lincoln Hall B)
9 a. m. to 12 m.

"Simplicity in Orthodontic Mechanisms with Special Emphasis on the Round Labial Arch"
By C. W. Koch.....Little Rock, Ark.
"Lingual Arch Wire; Observations on Its Scope and Status as an Orthodontic Mechanism"
By B. G. DeVries....Minneapolis, Minn.

"Rationalizing Angle-Simon Methods"
By Richard Lowy.....Newark, N. J.

PERIODONTIA
(Ramsey Hall A)

9 a. m. to 12 m.

"Periodontia as Based on Facts, Not Fads in Practice"
By Hunter S. Allen....Birmingham, Ala.

"Story of the Origin and Development of Periodontoclasia"
By T. B. Hartzell....Minneapolis, Minn.

"Constructive Treatment of Diseased Periodontal Tissues"
By T. Sydney Smith. San Francisco, Calif.

MOUTH HYGIENE, AND PREVENTIVE DENTISTRY
(Ramsey Hall B)

9 a. m. to 12 m.

"Restorative Dentistry for the Child"
By Floyde Eddy Hogeboom.....
.....Los Angeles, Calif.

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)
(Mezzanine Foyer)

9 a. m. to 12 m.

"Periapical Osteofibrosis with Cementum Formation and Fibrosis of Teeth"
By Edward C. Stafne..Rochester, Minn.

"Historical Review of the Research Activities of Organized Dentistry"
By Homer C. Brown....Columbus, Ohio

"Hydrogen Ion Concentration (p_H) of Dentifrices, Before and After Addition of Saliva"
By H. L. Hansen (Ph.D.)...Chicago, Ill.
L. S. Fosdick (Ph.D.)....Chicago, Ill.

"Relation of Certain Aciduric Bacteria and Certain Food Qualities to Dental Caries"
By Don C. Lyons.....Jackson, Mich.

"Occlusion as Applied to Denture Work"
By F. S. Meyer.....Minneapolis, Minn.

GENERAL CLINIC PROGRAM

THURSDAY AND FRIDAY AFTERNOONS, AUGUST 9-10

GROUP 1: COLLEGE CLINICS

University of Illinois

"Full Denture Impressions"
William J. Hogan.....Chicago, Ill.

"Porcelain Inlay Technic"
Margot Ulloa.....Chicago, Ill.

"Anatomy and Treatment of Root Canals in Therapeutic Procedures"
Edward Wach.....Chicago, Ill.

University of Pittsburgh, School of Dentistry

"General Anesthesia for Dental Surgery" (Illustrated Clinic Lecture)
W. Harry Archer.....Pittsburgh, Pa.

"Some Phases of Exodontia and Anesthesia"
W. Paul Walker.....Pittsburgh, Pa.

Medical College of Virginia, School of Dentistry

"Fixed Crown and Bridge Prosthesis"
Paul L. Chevalier .....Richmond, Va.

Marquette University College of Dentistry

"Pathologic Processes Incident to Trauma of Surgery"
C. R. Bodenbach.....Milwaukee, Wis.

GROUP 2: SECTION CLINICS

Operative Dentistry, Materia Medica and Therapeutics

"Fixed Bridges Cast in One Piece"
W. C. Shull.....Kansas City, Mo.

"Inlay Castings, Using Controlled Hygroscopic Expansion of the Investment to Compensate for Shrinkage"
C. H. Scheu.....Lakewood, Ohio

"Master Casts for Occlusal Reconstruction and Bite Coordination" (Illustrated by Motion Pictures)
E. E. Bailey.....Denver, Colo.

"Practical Application of Modernized Amalgam Technic"
William E. Harper.....Chicago, Ill.

"Inlay Technic"
L. P. Wagner.....Waupaca, Wis.

"Spring Lock System of Dental Restoration"
F. G. Neurohr.....New York City

"Mineral Supplementation and Therapeutics to Control Caries and Pyorrhea; Post-extraction Pain Control"
M. Francis Wielage.....Miami, Fla.

"Treatment of Periodontal Diseases and Other Mouth Lesions Caused or Aggravated by Metabolic Disturbances"
A. T. Rasmussen.....LaCrosse, Wis.

"Porcelain Jacket Crowns and Porcelain Inlays"
Sophia N. Bolotny.....Chicago, Ill.

"Operative Radiodontia"
Walter S. Thompson..Los Angeles, Calif.

"Cavity Preparation, Instrumentation and Manipulation of Gold Foil" (Accompanied by Motion Pictures)
R. W. Rule.....San Francisco, Calif.

"Cement"
C. S. Kile.....Hutchinson, Kas.

"Electro-Lay Models for Porcelain Inlays and Jacket Crowns"
Arthur J. Norman.....Detroit, Mich.

"Cavity Preparation and Casting Gold Inlays"
Emory O. West.....Des Moines, Iowa

"Surgical Treatment of the Hard and Soft Tissues in Closed Bites, When There Is Insufficient Room for Esthetic and Durable Restorations"
S. Marshall Weaver.....Cleveland, Ohio

"Ultraviolet Therapy in the Treatment of Pyorrhea; Its Relation to Bone Regeneration"
A. E. Weinstein.....New York City

"The Investment Expansion Control Method of Investing and Casting"
David W. Phillips.....Chicago, Ill.

"The Manipulation of Amalgam"
Harry C. Altaffer.....Kansas City, Mo.

"A B C's of Dental and Oral Reconstruction"
J. A. Loughry.....Cleveland, Ohio

Full Denture Prosthesis

"Immediate Duplicate Denture Service"
F. D. Miller.....Altoona, Pa.

"Correction of Congenital Cleft Palate Speech with Appliances"
John J. FitzGibbon.....Holyoke, Mass.

Orthodontia

"Orthodontic Case Histories"
Earl F. Lussier.....San Francisco, Calif.

"Impacted Cuspids; Method of Moving to Position"
R. W. Noland.....Des Moines, Iowa

"Pronounced Mesioclusion Case, with Complications Treated with the Twin Arch"
A. C. Gifford.....Oshkosh, Wis.

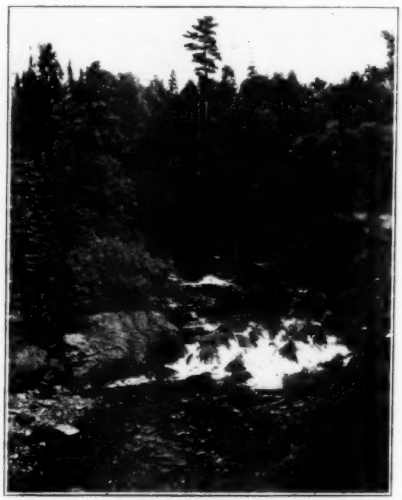
"Chrome Alloy Orthodontic Appliances"
Max R. Kadesky.....Dubuque, Iowa

"Methods of Closing, Opening and Maintaining Spaces in Orthodontia Management, Exemplified with Ribbon Arch Mechanism"
Burne O. Sippy.....Chicago, Ill.

"A Material to Replace Gold"
Homer M. Sheldon....Kansas City, Mo.

"Some New Ideas and Improvements in Labial Arch Technic"
Andrew F. Jackson....Philadelphia, Pa.

"Interesting Impaction of Lower Second Bicuspids"
Howard L. Jones.....Detroit, Mich.



Rapids near St. Paul.

"Diagnosis and Treatment of Certain Types of Class III Malocclusion"
J. Elon Rose.....Iowa City, Iowa

"Some Fundamental Principles in Diagnosis, Including Arch Predetermination"
Percy Norman Williams...Tucson, Ariz.

"Semiremovable Lingual Orthodontic Appliances That Have Proved Efficient in Our Practice"
Jesse F. K. Keeney.....Quincy, Ill.

"Treatment of a Crossbite Malocclusion in the Deciduous Denture"
Leland R. Johnson.....Chicago, Ill.

"A New and Original Mechanism for Extreme Overbite Cases"
B. F. Philbrook.....Sioux City, Iowa

"Motion Picture Animated Diagrams Indicating Developing Malocclusion Due to Premature Loss of Deciduous Teeth"
Howard E. Strange.....Chicago, Ill.

"Formula for a Low Cost Alloy"
R. C. Willett.....Peoria, Ill.

"Anterior Bands"
James W. Ford.....Chicago, Ill.

"Clinical Photography and Lantern Slide Making"
Mary Mikalonis (D.H.) Milwaukee, Wis.

"Methods of Avoiding Some of the Pitfalls in Orthodontic Practice"
Richard Lowy.....Newark, N. J.

"Orthodontia"
L. B. Higley.....Iowa City, Iowa

"Simplified Method of Molar Band Construction Requiring the Minimum Amount of Chair Time"
Howard Yost.....North Platte, Nebr.

"Treatment in Cases of Congenitally Missing Upper Lateral Incisors"
A. L. Thomas.....Minneapolis, Minn.

"Diagnosis and Arch Measurements"
Miland A. Knapp....Minneapolis, Minn.

"Cement Block as a Means for Gaining Vertical Dimension"
Jay N. Pike.....Minneapolis, Minn.
Joe M. Pike.....Minneapolis, Minn.

"Spot Welding, Chrome Alloys for Orthodontia Use"
A. B. Brusse.....Denver, Colo.
J. L. Carman.....Denver, Colo.

Periodontia

"Surgical Eradication of Infected Paradentium"
A. W. Ward.....San Francisco, Calif.

"Subgingival Treatment in Oral Surgery"
A. B. Vastine.....Bloomsburg, Pa.

GROUP 3: STATE ASSOCIATION INDIVIDUAL CLINICS AND GROUP CLINICS

Alabama

"Amalgam"
C. C. Cannon.....Fayette, Ala.

California State

"Treatment of Abscessed Deciduous Teeth"
John E. Gurley.....San Francisco, Calif.

"Osseous Changes in the Alveolar Process"
Frank H. McKevitt..San Francisco, Calif.

"Construction of Anterior Facings for Porcelain Bridgework"
J. Raymond Gill....San Francisco, Calif.

California Southern

"Assistant Problem for Gold Foil Condensation Solved"
Walter C. Harbart...Los Angeles, Calif.

"Combination Technic and Alveolectomy"
Frank S. Kaiser.....Los Angeles, Calif.

"Reading a Paper"
Richard G. Lyon...Santa Barbara, Calif.

"A Study of Model Alloys"
J. D. Shriber.....Los Angeles, Calif.

"Oral and Plastic Surgery"
Arthur E. Smith.....Los Angeles, Calif.

"Calcium Metabolism in Relation to the Formation of Calculi"
Alex S. Lehman.....Los Angeles, Calif.

"Simplified and Improved Full Denture Technic"
Wilfred H. Terrell.....Pasadena, Calif.

American Dental Assistants Association Group Clinic

Connecticut

"Maxillary Sinus Roentgenograms for the Dentist"
R. Bullock Jones.....Willimantic, Conn.

"Indirect Gold Inlays Showing Detailed Steps in the Preparation of Practical Cases"
E. M. Clifford.....Hartford, Conn.

"Inlay Technic for the Average Practitioner"
Henry Hicks.....Greenwich, Conn.

Illinois

"Direct Inlay Technic for Difficult Cases"
Charles S. Bigelow.....Evanston, Ill.

"Cavity Preparation and Demonstration Models for Inlay and Foil Work"
Basil A. Cupis.....Chicago, Ill.

"Satisfactory Root Canal Technic"
John H. Hospers.....Chicago, Ill.

"Face Masks and Demonstration Models in Repowax"
Reginald H. Johnson.....Chicago, Ill.

"Fixed Bridge Technic—One-Piece Casting"
C. P. Janicki.....Chicago, Ill.

"Root Canal Anatomy"
A. H. Mueller.....Chicago, Ill.

"Cement Manipulation"
George C. Pike.....Chicago, Ill.

"Fixed Bridgework in Two Sittings"
Harry Spiro.....Chicago, Ill.

"Gold Inlay, Three Quarter Crown and Cut-Full Crown; Technic of Wax Manipulation, Carving the Pattern, Investing and Casting"
Leo S. Seidner.....Chicago, Ill.

"Children's Dentistry"
Louis F. Tinthoff.....Peoria, Ill.

GROUP CLINICS

Mt. Sinai Hospital Exhibit (Department of Oral Surgery)
Emil L. Aison.....Chicago, Ill.
S. S. Levadi.....Chicago, Ill.

Junior Dentistry

(In charge of E. F. Grabow)

"Junior Reception Room"
E. F. Grabow.....Glen Ellyn, Ill.

"Junior's Introduction to Operating Room"
Earl E. Graham.....Chicago, Ill.

"Functional Space Maintainers"
Howard I. Michener.....Chicago, Ill.

"Local Anesthesia"
Joseph B. Sherman.....Chicago, Ill.

"Nitrous Oxide Anesthesia"
C. E. Norris.....Chicago, Ill.

"Simple and Easy Impressions"
C. J. Ringle.....Chicago, Ill.

"Junior Education of Child in Chair"
Lon W. Morrey.....Chicago, Ill.

"Cartoons and Pictures in Pedodontia"
Harry B. Shafer.....Anna, Ill.

Indiana

"Full Denture Construction"
Walter E. Beyer.....Indianapolis, Ind.

"Amalgam Restorations"
Robert L. Foster.....Indianapolis, Ind.

"Dental Ceramics; A Technic Eliminating the Platinum Matrix"
Robert K. George.....Indianapolis, Ind.

"Simplified Technic for Securing Correct Horizontal Angulation for Interproximal Roentgenograms"
Harry N. Nagle.....Indianapolis, Ind.

"Oral Surgery"
J. Thayer Waldo.....Indianapolis, Ind.

Iowa

"Cavity Preparation for Amalgam Fillings"
George S. Easton.....Iowa City, Iowa

"Preextraction Records"
Earle S. Smith.....Iowa City, Iowa

"Facial Casts Portraying the Surgical Stages, Anatomic Relations and Delivery of Impacted Upper Third Molars, Impacted Mandibular Third Molars and Lingually Impacted Cuspids"
R. J. Carroll.....Waterloo, Iowa

"Electrical Soldering Apparatus"
W. J. Cameron.....Des Moines, Iowa

"Centrifugal Investing and Casting"
W. A. Sharp.....Des Moines, Iowa

"Making and Use of the Face Moulage"
John F. Dwight.....Des Moines, Iowa

Woodland road near St. Paul.

GROUP CLINICS

"Gold Foil"
H. D. Coy.....Hamburg, Iowa
H. G. Bolks.....Sioux City, Iowa
W. H. Kenderdine.....Sioux City, Iowa

"Gold Foil and Gold Inlays"
Erling Thoen.....Iowa City, Iowa
J. V. Blackman.....Iowa City, Iowa
Clay Burkhardt.....Iowa City, Iowa

"Porcelain Jacket Crowns"
A. O. Klaffenbach.....Iowa City, Iowa
A. F. Koch.....Iowa City, Iowa

"Partial Dentures"
C. L. Fenner.....Cedar Rapids, Iowa
C. V. Lehman.....Cedar Rapids, Iowa
J. H. Kelly.....Cedar Rapids, Iowa
M. B. Katzoff.....Cedar Rapids, Iowa

"Full Dentures"
By Neil Full Denture Study Club, Cherokee, Iowa.
F. A. Barnes.....Cherokee, Iowa
Floyd Bridge.....Storm Lake, Iowa
E. B. Smith.....George, Iowa
A. J. Tanner.....Cherokee, Iowa
T. C. Raymond.....Storm Lake, Iowa
F. M. Minnich.....Laurens, Iowa
C. E. Summy.....Paulina, Iowa

Kansas

"Stereoscopic Roentgenograms for Accurate Diagnosis. An Angle Marking Device (Oli-Nometer) Employed During Exposure for Clearer Visibility"
E. P. Cressler.....Newton, Kas.

"New Technic for Making Full Upper and Lower Closed Mouth Impressions"
Ray A. Denman.....Beloit, Kas.

"Difference Between 'Just Fillings' and Amalgam Restorations"
C. B. Erway.....Hays, Kas.

"Copper Amalgam Dies for Indirect Inlay Work"
E. E. Ramsey.....Topeka, Kas.

"Synthetic Porcelain Restorations"
L. J. Wyatt.....Kansas City, Kas.

Maryland

"Management of the Cavity and Gold Foil for a Class III Restoration"
Harry E. Latcham.....Baltimore, Md.

"State Health Department as a Medium of Dental Health Education"
Richard C. Leonard.....Baltimore, Md.

Minnesota

"Case Reports, Treatment and Results"
E. J. Mohn.....Elmore, Minn.

"Simplified Waxing Up of Three-Quarter Crowns"
A. E. Simonson....Pelican Rapids, Minn.

"Visual Education of the Patient"
H. E. Niebels.....Fergus Falls, Minn.

"Surgical Pyorrhea"
Herbert A. Beaudry Grand Rapids, Minn.

"Orthodontia for the General Practitioner"
Robert P. Miller.....Appleton, Minn.

"Small Dental Group Organizations"
M. Alfred Martinson.. Princeton, Minn.

"Inlay Castings"
L. E. Shafer.....Tower, Minn.

"Amalgam Fillings"
John L. Richards.....Virginia, Minn.

"Immediate Esthetic Restoration of the Mouth Following Extraction"
Francis J. Pexa.....Montgomery, Minn.

"Alveolar Process Trimming"
C. H. Godward.....Elbow Lake, Minn.

"Practical Models for the Education of the Patient"
I. T. Kvale.....Willmar, Minn.

"Gold Inlays for Children" (With Patient)
Vernon M. Hanson.....Appleton, Minn.

"Cast Crown—New Technic"
C. L. Lynn.....Redwood Falls, Minn.

"The Inciso-Interproximal Cast Pin Gold Inlay"
Herbert E. Gardner..Browerville, Minn.

"Demonstration Models of Gold Restorations and Shaping and Staining of Porcelain Teeth"
Ray F. Goering.....Duluth, Minn.

"Is Prevention Receiving Its Share of Attention?"
John A. Maker.....Duluth, Minn.

"Space Retainers Employed Where Premature Loss of Deciduous Teeth Has Occurred"
Harold N. Weickert....Wheaton, Minn.

"Removal of Impacted Third Molar"
G. W. Geenty.....Ortonville, Minn.

"Oral Surgery"
E. A. Thompson.....
.....International Falls, Minn.

"Demonstrating Models as Time Savers in Explaining to Patients the Kind of Work to Be Done"
W. H. James.....Lake Crystal, Minn.

"Autobiography of a Mandible"
A. Hubert Fee.....Duluth, Minn.

"Review of Mandibular Injection"
C. G. Denzine.....Springfield, Minn.

"Method of Taking Impression for Lower Partial Denture"
L. K. Van Valkenburg
.....Long Prairie, Minn.

"Immediate Postextraction Care and Closure of Socket Without Suturing"
G. Edward Larson.....St. Peter, Minn.

"My Little Patients"
Henry J. Schopf.....Clarissa, Minn.

"Troublesome Pin Inlays for Anterior Teeth"
C. G. Gillam.....Austin, Minn.

"Premedication and Postmedication"
W. Lester Webb.....Fairmont, Minn.

"Treatment of Vincent's Infection"
E. H. McGonagle.....Royalton, Minn.

"Use of Stearic Acid and Acetone in Finishing Models"
L. W. Gange.....St. Paul, Minn.

"Retention for Full Dentures"
Maurice L. Green.....St. Paul, Minn.

"Technic for Casting Backings for Steel Facings, True Pontics and Sani-Pontics"
Bert L. Cole.....St. Paul, Minn.

"New Principle in Three-Quarter Crown Construction"
Walter E. Jones.....St. Paul, Minn.

"Treatment of Periodontoclasia"
Oscar Bjorndahl.....St. Paul, Minn.

"Proper Manipulation of Synthetic Porcelain"
Carl J. Agrell.....St. Paul, Minn.

"Exodontia Clinic—General Anesthesia" (Crippled children's clinic)
Samuel Ziegler.....St. Paul, Minn.

"Designing Partial Dentures"
H. C. Curley.....St. Paul, Minn.

"Casts of Practical Case Before and After Fixed Reconstruction; Demonstrating Occlusal Balance"
Harry B. Horwitz.....St. Paul, Minn.

"Different Treatments of First Permanent Molar"
Herbert A. McQuillan...St. Paul, Minn.

"Dentist's Responsibility"
William Brandstad.....St. Paul, Minn.

"Esthetics in Regard to Anterior Bridgework"
W. C. Pitzen.....St. Paul, Minn.

"Indirect Technic in Construction of Anterior Abutments"
F. A. Heiberg.....St. Paul, Minn.

"Oxyeugenol Cements for Cement Bases and Cavity Linings Under Metallic Restorations"
E. E. Luhring.....Faribault, Minn.

"Calcium Loss Due to a Diseased Parathyroid Gland; Case of Osteitis Fibrosa Cystica"
V. W. Dedon.....St. Paul, Minn.

"Practical Dental Therapeutics"
A. F. Anderson.....St. Paul, Minn.

"Accurate Method of Reproducing Original Tooth Form in Crown and Bridge Work"
W. E. Omundson....Minneapolis, Minn.

"Postoperative Treatment of Dry Socket and Pyorrhea"
H. E. Karnofsky.....Minneapolis, Minn.

"Simplified Method of Taking Impressions for the Stabilization of Dentures"
Thomas J. Mee.....Minneapolis, Minn.

"Direct Method of Taking Wax Models"
Earl L. Rice.....Minneapolis, Minn.

"Impression Technic for Porcelain Jacket Crowns"
Otto S. Bylund.....Minneapolis, Minn.

"Selection of Sealers for General Sealing for Efficiency and Ease of Sharpening, with a New Effective Brushing Technic"
Henry N. Reinking...Minneapolis, Minn.

"Orthodontia for Children from Five to Eight Years of Age"
R. L. Dunton.....Minneapolis, Minn.

"Partial Denture Design"
George W. Boos.....Minneapolis, Minn.

"Crown and Bridge Preparations and Restorations"
R. A. Ulvestad.....Minneapolis, Minn.

"Conservative Surgical Procedures in Treating Pyorrhea"
Wesley V. Buck.....Minneapolis, Minn.

"Cast Overlays and Practical Hints on Child Dentistry"
E. F. Allis.....Minneapolis, Minn.

"Roentgenograms of Temporomandibular Articulation Showing Especially Head and Neck of Condyle"
W. W. McQueen....Minneapolis, Minn.

"Diagnosis and Basis for Successful Child Practice"
Thomas P. Ryan.....Minneapolis, Minn.

"Orthodontic Treatment of Impacted Anterior Teeth"
P. M. Dunn.....Minneapolis, Minn.

"Radio Chair"
Elmer S. Best.....Minneapolis, Minn.

"Securing Unstrained Centric Relation with Intra-Oral Gothic Arch Tracer"
Herbert A. Munns...Minneapolis, Minn.

"Cysts of the Mandible and Maxilla"
Louis R. Weiss.....Minneapolis, Minn.

"Education of Patient About Diet Pertaining to Mouth Health"
Carl A. Lindahl.....Minneapolis, Minn.

"Control of Decay and Treatment of Exposed Pulps in the Obstinate and Obstreperous Child"
T. R. Butler.....Mankato, Minn.

"Modeling Compound Restorations on Large Plaster Teeth for Demonstrating to Patients"
M. R. Coulter.....Mankato, Minn.

"Should the General Practitioner Practice Orthodontia?"
F. T. Conway.....Mankato, Minn.

"Gold Castings in Artificial Teeth"
Clifford J. Peterson.....Mankato, Minn.

"Short Cuts"
Paul W. Barney.....Mankato, Minn.

"Orthodontic Suggestions"
C. W. Moulton.....Mankato, Minn.

"Lingual Retention Inlays Including Points on Cavity Preparation; Impression Taking and Repairing of Faulty Margins with Foil"
D. J. Harrison.....Mankato, Minn.

"Quick, Neat, Accurate Remake with Jumping the Bite"
A. Murray Hawes.....Mankato, Minn.

"Immediate Dentures"
W. A. C. Ochs.....Mankato, Minn.

"Combination of Direct and Indirect Adaptation of Inlays"
C. W. Girvin.....Mankato, Minn.

"Treatment and Control of Vincent's Infection"
C. N. Weyer.....Mankato, Minn.

"Distal Inlay in Rotated Lower Cuspids"
W. W. Zettler.....Mankato, Minn.

GROUP CLINIC

"Practical and Simple Technic for Taking Full Upper and Lower Impressions Under a Masticating Pressure"
R. L. Wenberg.....Mt. Lake, Minn.

"Set-up—Full Upper and Lower from Masticating Pressure Technic with Natural Staining Technic Including Finished Case"
M. A. Middleton.....Windom, Minn.

"Use of Edgewise Arch on Models Showing Monthly Progress of Treatment with Edgewise Arch from the Start to Retention with Pictures, Roentgenograms and Heal Plates"
Sherwood R. Steadman...St. Paul, Minn.

"Wire Ligature Former—A Time Saver in Tying the Edgewise Arch in Brackets"
Guy B. Steadman.....St. Paul, Minn.

"Treatment of Deciduous and Early Permanent Teeth"
Henry N. Scheibe....Minneapolis, Minn.
John N. Bong.....Minneapolis, Minn.

"Surgical Requirements for Immediate Denture Service"
K. Paul Carson.....Minneapolis, Minn.

"Immediate Dentures"
A. W. Simonson.....Minneapolis, Minn.

"Manipulation of Gold Foil and Amalgam"
C. J. Hagen.....Mankato, Minn.
William M. Standish....Mankato, Minn.

ST. CLOUD GROUP CLINIC

"Inlays, Wax Patterns and Castings"
C. L. Miner

"Bridgework and Inlays"
L. A. Haen

"Stabilizing Lower Dentures"
J. B. Cullen

"Partial Dentures"
M. F. Cook

"Amalgam Fillings"
V. H. Ernst

"Short Cuts on Three-Quarter Crown Work"
N. T. Ahmann

"Bridge Abutments with Pontics"
M. A. Sivinski

"Bridge Pontics"
N. J. Lahr

"Immediate Dentures"
O. P. Brick

"Wax Model"
J. H. Kropp

"Mixing Cement"
N. D. Pappenfus

"Amalgam Fillings"
V. W. Schaefer

MONSON RESEARCH AND STUDY CLUB

Harold L. Harris, *Chairman*

Section I. "History of the Early Experimental Work and Development of the Theory"
H. B. Washburn.....St. Paul, Minn.

Section II. "Mounting of Casts of Natural Teeth"
A. G. Bjorklund.....St. Paul, Minn.
M. O. Nelson.....St. Paul, Minn.
A. J. Sauer.....St. Paul, Minn.
C. W. Holtzman.....St. Paul, Minn.

Section III. "Reconstruction—Operative and Crown and Bridgework"
C. K. Bird.....St. Paul, Minn.
O. J. Merwin.....St. Paul, Minn.
M. G. Walls.....St. Paul, Minn.
A. Van Ark.....Toledo, Ohio
H. G. Morton.....Milwaukee, Wis.
George A. Lawson.....Duluth, Minn.

Section IV. "Reconstruction—Partial and Full Dentures"
R. G. Keyworth.....St. Paul, Minn.
C. H. Jamieson.....Detroit, Mich.
H. W. Rieke.....Minneapolis, Minn.
Arthur P. Little.....Richmond, Va.
H. D. Aldrich.....St. Paul, Minn.

Section V. "Periodontia and Roentgen-Ray Diagnosis"
Vern D. Irwin..... Duluth, Minn.
L. M. Cruttenden.....St. Paul, Minn.
Section VI. "Geometrical Proof of the Theory"
C. W. Benson.....Duluth, Minn.

F. S. MEYER GROUP

"Balanced and Functional Occlusion Using a Plane Line Articulator"
F. S. Meyer.....Minneapolis, Minn.
Elmer J. Sundby.....Duluth, Minn.
William J. Von Bank...New Ulm, Minn.
J. B. Towey.....Minneapolis, Minn.

AMALGAM GROUP CLINIC

"Amalgam"
Alfred Olson.....Minneapolis, Minn.
George B. Olson.....Minneapolis, Minn.
R. F. Ehlke.....Minneapolis, Minn.
E. E. Ohsberg.....Minneapolis, Minn.
H. H. Godberson.....Northfield, Minn.
H. A. Rippe.....Minneapolis, Minn.
Charles F. Hanson...Minneapolis, Minn.

G. V. BLACK CLUB OF ST. PAUL

J. W. S. Gallagher, President
.....Winona, Minn.
O. C. E. Zieger, Vice President
.....Owatonna, Minn.
R. B. Wilson, Secretary..St. Paul, Minn.
C. A. Searl, Clinic Director
.....Owatonna, Minn.

"Gold Foil Operation: Mesial or Distal Surface of an Upper Incisor"
Operators: C. F. Clark..Menomonie, Wis.
F. S. James.....Winona, Minn.
W. R. Brooks.....Colfax, Wis.
Table Clinicians: Arthur W. Swanson
.....Minneapolis, Minn.
R. H. Eveland.....Minneapolis, Minn.

"Gold Foil Operation: Mesioclusal Surface of an Upper Bicuspid or Molar"
Operators: W. Douglas James
.....Winona, Minn.
J. H. Burns.....Hutchinson, Minn.
S. M. Searl.....Kenyon, Minn.
Table Clinician: B. P. Wrbitzky
.....Hutchinson, Minn.

"Gold Foil Operation: Occlusal Surface of an Upper Molar"
Operator: C. A. Nelson....Amery, Wis.

"Gold Foil Operation: Buccal Surface of an Upper Bicuspid"
Operator: B. K. Braun
.....Minneapolis, Minn.
Table Clinician: R. E. Luiten
.....Mora, Minn.

Table Clinic: "Preparation of Gold Foil for Daily Use Showing Method of Making Pellets and Cylinders"
W. W. Irle.....New Richmond, Wis.

Illustrated Clinic: "Relation of Pulp Chamber to Operations in Teeth"
Bert R. Carlson.....Minneapolis, Minn.

UNIVERSITY OF MINNESOTA GROUP CLINIC

Crown and Bridge Work: "Oral Diagnosis Clinic"
P. J. Brekhus.....Minneapolis, Minn.
H. F. Wahlquist (M.D.)
.....Minneapolis, Minn.

"Abutment Preparations Commonly Used in Crown and Bridge Construction"
A. B. Hall.....Minneapolis, Minn.

"Unusual and Esthetic Bridge Abutments"
Charles Peterka.....Minneapolis, Minn.

"Impressions by the Direct Method"
C. F. Otto.....St. Paul, Minn.

"Banded Crowns"
A. A. Pagenkopf.....St. Paul, Minn.

"Simple, Practical Method of Mounting and Checking Cases"
E. T. Tinker.....Minneapolis, Minn.

"Various Types and Forms of Pontic Construction Used in Fixed Bridgework"
E. A. Nelson.....Minneapolis, Minn.

"Cementation and Its Importance"
H. C. Nelson.....St. Paul, Minn.

"Procedures in the Restoring of Individual Teeth with Porcelain"
L. C. McCarthy.....St. Paul, Minn.
R. R. Henry.....Minneapolis, Minn.
W. D. Vehe.....Minneapolis, Minn.

Operative Dentistry: "Foils"
M. O. Pattridge.....Minneapolis, Minn.
J. M. Little.....St. Paul, Minn.
J. M. Freeburg.....Minneapolis, Minn.

"Inlays"
L. W. Thom.....Minneapolis, Minn.
G. W. Lundberg.....St. Paul, Minn.
G. D. Estes.....Minneapolis, Minn.

"Amalgam"
A. B. Butter.....Minneapolis, Minn.

"Silicates"
R. S. Maybury.....Minneapolis, Minn.

Orthodontia: "Orthodontia"
J. O. Baker.....St. Paul, Minn.
H. E. Colby.....Minneapolis, Minn.
C. G. Rudd.....Minneapolis, Minn.

Oral Surgery: Round Table—"Extraction of Teeth"
E. E. MacGibbon....Minneapolis, Minn.
Charles A. Wiethoff.Minneapolis, Minn.
F. H. Hayes.....Minneapolis, Minn.
C. E. Hermann.....Minneapolis, Minn.
E. W. Nelson.....Minneapolis, Minn.
C. A. Griffith.....Minneapolis, Minn.

Oral Pathology and Periodontia: Periodontia Round Table
E. Raymond Johnson....St. Paul, Minn.
Dorothea Radusch...Minneapolis, Minn.
Daniel R. Clark.....Minneapolis, Minn.

"Fractures of the Jaws"
C. W. Waldron.....Minneapolis, Minn.

"Oral Tumors; Pathology and Treatment"
Harold G. Worman.Minneapolis, Minn.

Prosthesis: "Lower Impressions; Modified Technic"
H. C. Lawton.....St. Paul, Minn.

"Sectional Impressions, Using Modeling Compound for Partial Cases"
L. A. Harker.....Minneapolis, Minn.

"Impression Technics"
R. M. Jernall.....Minneapolis, Minn.

"Prosthetic Constructions for Abnormal Cases"
R. W. Delton.....Minneapolis, Minn.

Missouri

"Oral Lesions Due to Hypersensitiveness"
Virgil Loeb.....St. Louis, Mo.

"Porcelain Jacket Crown; How Tooth Form Can Govern Preparation and Restoration"
Russell C. Wheeler.....St. Louis, Mo.

Nebraska

"Gold Inlays"
F. D. Carman.....Omaha, Nebr.

"Manipulation of Pulpless Teeth"
W. Clyde Davis.....Lincoln, Nebr.

"Recurrence Lock Wire"
W. E. Stoft.....Omaha, Nebr.

"Orthodontia"
C. A. Anderson.....Beatrice, Nebr.

"Individual Base Plate Construction"
L. A. Donahue.....Sidney, Nebr.

"Visual Education"
E. H. Bruening.....Omaha, Nebr.

"Chrome Alloy"
A. M. Dunn.....Omaha, Nebr.

American Dental Hygienists Association Group Clinic

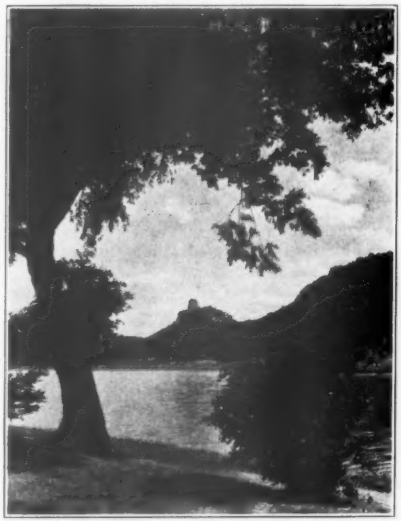
New Jersey

"Preparation of the Three-Quarter Crown and Slice-Lock Inlays for Fixed Bridgework"
Benjamin Mahler.....Jersey City, N. J.

"Methods of Eliminating the Periodontal Pocket"
Joseph R. Walsh.....East Orange, N. J.

"Official Sedatives, Hypnotics and Analgesics"
Clifford L. Whitman..Hackensack, N. J.

"A Simple, Practical, Dependable Method of Making the Pinledge Abutments, Cast Direct"
Walter A. Schilke.....Englewood, N. J.



Lake near St. Paul.

New York

"Pulpodontia—Technic to Eliminate Unnecessary Armamentarium in Pulp Canal Therapy"
Harry Albert.....New York City

"Malocclusion Treated with Edgewise Arch Mechanism"
Leon D. Bryant.....Syracuse, N. Y.

"Value of Complete Roentgen-Ray Examination"
W. N. Brewer.....Niagara Falls, N. Y.

"Orthodontia for the General Practitioner"
Thomas F. Cloney.....New York City

"Partial Dentures, Design and Construction"
Bently L. Craig.....Buffalo, N. Y.

"Simple and Effective Technic of Drill and Lever for Root Removal and Impacted Teeth"
M. Hillel Feldman.....New York City

"Clasps"
Amhsel Gueft.....New York City

"The Preparation of Proximal Cavities in Teeth for Gold Foil and Amalgam"
Leroy L. Hartman.....New York City

"Nitrous Oxide and Oxygen Anesthesia in Dental and Oral Surgical Operations"
P. F. Hildebrand.....New York City

"Surgical Treatment of Pyorrhea"
Albert C. Hitzelberger.....Utica, N. Y.

"Anatomy and Its Relation to Dentistry"
William H. Hyde.....Brooklyn, N. Y.

"Preparation for Jacket Crowns"
Daniel Jutton.....Syracuse, N. Y.

"Inlays"
George F. Lindig.....New York City

"Cast Gold Inlays, Using Your Own Investment Compound"
Arthur S. Litten.....New York City

"Routine Roentgen-Ray Examinations of Children's Teeth"
John Oppie McCall.....New York City

"Standard Periodontia Practice"
I. S. Miller.....New York City

"Vincent's Infection"
Edward F. Mimmack.....Buffalo, N. Y.

"Cast Gold Inlays, Cast Crowns, Onlays, Pinlays, and Pinledge Attachments and Their Application in Modern Crown and Bridgework"
Gordon C. Peck.....Glen Falls, N. Y.

"Block Anesthesia"
Herman L. Reiss.....New York City

"Fundamental Principles in the Correction of Occlusal Disharmony, Natural or Artificial"
Clyde H. Schuyler.....New York City

"Modern Concepts of Root-Canal Therapy"
Jacob B. Schneer.....New York City

"Means of Increasing the Stability and Comfort of Prosthetic Dentures"
Victor H. Sears.....New York City

"Rebasing Technic—Full Upper Dentures"
G. P. Smith.....New York City

"Gold Inlays—Waxing, Investing and Casting"
Emory C. Thompson.....Buffalo, N. Y.

"New Technic in Radiodontia"
Ralph S. Voorhees.....Rochester, N. Y.

"Pulp Testing and Transillumination"
C. Raymond Wells.....Buffalo, N. Y.

"Osteomyelitis of the Jaws—Importance of Proper Diagnosis and Rationale of Its Treatment"
Leo Winter.....New York City

"Mat Gold Technic"
Paul W. Zillman.....Buffalo, N. Y.

"Technic for Taking Impressions for Crowns and Inlays by the Indirect Method"
Joseph A. Burgun.....Brooklyn, N. Y.

"Diagnosis of Oral Lesions Using Colored Moulages"
Daniel E. Ziskin.....New York City

"Bridgework; Fixed Restorations, Cavity Preparation and Abutment Construction of Varied Character"
J. R. Schwartz.....Brooklyn, N. Y.

North Dakota

"Some Considerations in the Handling of Jaw Fractures"
Russell A. Sand.....Fargo, N. D.

GROUP CLINIC

"Immediate and Complete Denture Service"
W. K. Taylor.....Fessenden, N. D.

"Immediate and Complete Denture Service"
P. G. Ackerman.....Valley City, N. D.

"Immediate and Complete Denture Service"
L. S. Stenseth.....Jamestown, N. D.

Oklahoma

"Dental Education"
J. B. Jenkins.....Oklahoma City, Okla.

"Basic Rules in Prosthetic Technic"
J. B. Herring.....Oklahoma City, Okla.

"Fixed Bridgework"
A. F. Sebert.....Clinton, Okla.

"Porcelain Jacket Crowns and Inlays"
H. O. Warrick.....Enid, Okla.

"Selling Dentistry with Photographs"
Harry H. Sorrels...Oklahoma City, Okla.

"Pinlay Attachments"
J. N. Glass.....Tulsa, Okla.

"Anomalies in Exodontia"
S. P. Bowyer.....Tulsa, Okla.

Ohio

"Dental Problems Involving the Maxillary Sinus"
R. F. Deebach.....Dayton, Ohio

Pennsylvania

"Contraction Control and Marginal Seal in Inlays"
C. S. Harris.....Pittsburgh, Pa.
"Filling of Root Canals"
C. T. O'Connor.....Pittsburgh, Pa.
"Restoring Occlusal Equilibrium"
W. J. Robinson.....Philadelphia, Pa.
"Manipulation of Porcelain"
E. Bruce Clark.....Uniontown, Pa.

South Dakota

"New Method of Making Lower Denture with One Vulcanization"
Raymond W. Ellis.....Salem, S. D.
"Immediate Denture Service"
C. K. Walker.....Huron, S. D.
"Some Thoughts on Inlays, Crowns and Bridges"
E. D. Buettell.....Mitchell, S. D.

GROUP CLINIC

"A Casting Technic Based upon Data Supplied by National Bureau of Standards in Collaboration with A.D.A. Research Committee"
H. G. Tarbell.....Watertown, S. D.
B. E. Jacobs.....Garretson, S. D.
E. O. Dietrick.....Sioux Falls, S. D.
F. T. Armstrong.....Sioux Falls, S. D.
H. E. Donohue.....Sioux Falls, S. D.
H. J. Carlton.....Sioux Falls, S. D.
O. W. Hanson.....Madison, S. D.
P. M. Rensvold.....Madison, S. D.
P. L. Scofield.....De Smet, S. D.
A. W. Frerichs.....Wakonda, S. D.
A. R. Schmid.....Worthington, Minn.

Tennessee

"Periodontoclasia Associated with Restricted Occlusal Function"
S. S. Friedman.....Memphis, Tenn.
"Fixed Bridges Cast in One Piece"
George L. Powers, Jr....Memphis, Tenn.
"Case Records Showing Effect of Oral Infection on Athletes"
C. W. Campbell.....Memphis, Tenn.
"Fixed Bridges"
O. M. Jamieson.....Memphis, Tenn.
"Amalgam Fillings"
R. S. Vinsant.....Memphis, Tenn.
"Removable Bridges"
H. F. Middlecoff.....Memphis, Tenn.
"Everyday Exodontia"
J. L. Austin.....Chattanooga, Tenn.

GROUP

"Orthodontia"
O. A. Oliver.....Nashville, Tenn.
C. R. Wood.....Knoxville, Tenn.

Texas

"Radical Surgical Treatment of Vincent's Infection"
T. F. Coyle.....Beaumont, Texas
"Labial Frenum Operation"
J. O. Hall.....Waco, Texas
"Electric Welding and Soldering"
George G. Ingham.....Amarillo, Texas
"Detection and Correction of Occlusal Trauma"
L. A. Neil.....El Paso, Texas
"Practical Suggestions in Crown and Bridge"
Dan C. Peavy.....Cuero, Texas
"Electrical Castings"
F. D. Layman.....Whitewright, Texas
"Amalgam"
A. C. Raymond.....Abilene, Texas
"Practical Cases in Root-Canal Treatment"
S. L. Barron.....Dallas, Texas
"Fixed Bridges"
E. L. Brown.....Fort Worth, Texas
"Buildin~ to Occlusal Registrations"
F. W. Hinds.....Dallas, Texas
"Interesting and Unusual Case" (Illustrated by an animated motion picture)
O. W. B. McCall.....Temple, Texas
"Amalgam, Its Manipulation and Cavity Preparation Compared to That of Gold Inlays"
R. F. McCasland.....Tulia, Texas

Virginia

"Surgical Treatment of the Gingivae"
E. G. Gates.....Norfolk, Va.
"Saving on Dental Supplies"
R. F. Freeman.....Richmond, Va.

Washington

"Platinum Matrices for Porcelain Inlays"
C. F. Fiset.....Seattle, Wash.
"Simple Method of Making Accurate Fitting Inlay Castings"
John T. Ryan.....Mt. Vernon, Wash.

THE ST. PAUL SESSION

RADIO PROGRAM

Tuesday, August 7

1:15 p.m.

Station WCCO, "Prevalence of Dental Decay Among American Children"
C. T. Messner.....Washington, D. C.

3:45 p.m.

Station KSTP, "Saving Young America's Teeth"
Charles A. Sweet.....Oakland, Calif.

8:15 p.m.

Station WRHM, "Care of the School Child's Teeth"
B. E. Erikson.....Washington, D. C.

Wednesday, August 8

1:00 p.m.

Station WCCO, "Can Decay of Teeth Be Prevented?"
Walter T. McFall.....Macon, Ga.

3:45 p.m.

Station KSTP, "The Mouth as an Indicator of General Health"
Charles Lane.....Detroit, Mich.

8:15 p.m.

Station WRHM, "Giving Children a Better Chance"
E. L. Pettibone.....Cleveland, Ohio

Thursday, August 9

1:15 p.m.

Station WCCO, "Diseases of the Human Mouth and How They Can Be Avoided"
T. A. Hardgrove.....Fond du Lac, Wis.

3:45 p.m.

Station KSTP, "Causes of Pyorrhea"
H. G. Morton.....Milwaukee, Wis.

8:15 p.m.

Station WRHM, "Trench Mouth"
Lon W. Morrey.....Chicago, Ill.

LUNCHEON CLUB PROGRAM

Tuesday, August 7—12:15 p.m.

Cooperative Club, St. Paul Athletic Club
C. J. Hollister.....Harrisburg, Pa.

Rotary Club of St. Paul, St. Paul Hotel
A. C. Wherry.....Salt Lake City, Utah

Zonta Club of St. Paul, Women's City Club of St. Paul
Haidee Weeks.....New Orleans, La.

Wednesday, August 8—12:15 p.m.

Cosmopolitan Club, St. Paul Hotel
Arthur D. Black.....Chicago, Ill.

Exchange Club, St. Paul Hotel
Arthur H. Miller.....New York City

Thursday, August 9—12:15 p.m.

Business and Professional Men's Club of St. Paul, St. Paul Hotel
Donald M. Gallie.....Chicago, Ill.

Ashlar Club, Minnesota Club
Harvey J. Burkhart.....Rochester, N. Y.

Kiwanis Club of St. Paul, Athletic Club
John P. Buckley.....Hollywood, Calif.

Optimist Club of St. Paul, Lowry Hotel
E. L. Pettibone.....Cleveland, Ohio

WOMEN'S PROGRAM

Monday, August 6

9:30 p.m. Ice Carnival—Municipal Auditorium.

Tuesday, August 7

9:30 a.m. First General Session of the American Dental Association in the Auditorium Theater.

7:45 p.m. Second General Session of the American Dental Association in the Auditorium Theater.

Wednesday, August 8

1:00 p.m. Luncheon—White Bear Yacht Club, White Bear Lake, Minnesota.
(Admission by ticket only. Busses will leave the City Hall at 10:00 a.m.)

7:45 p.m. Third General Session of the American Dental Association in the Auditorium Theater.

Thursday, August 9

10:00 p.m. President's Ball, Palm Room, St. Paul Hotel (Summer Formal).
In honor of the retiring President, Arthur C. Wherry.

HEALTH AND SCIENTIFIC EXHIBITS

1. Indiana University, School of Dentistry, Indianapolis, Ind.
2. University of Louisville, School of Dentistry, Louisville, Ky.
3. Northwestern University Dental School, Chicago, Ill.
4. University of Illinois, School of Dentistry, Chicago, Ill.

5. American Dental Assistants Association.
6. American Dental Hygienists' Association.
7. American Dental Association, Chicago, Ill.
8. Rochester Dental Dispensary, Rochester, N. Y.
9. Board of Education, E. H. Jones, Cincinnati, Ohio.
10. Samuel Rabkin, 711 Doctors Bldg., Cincinnati, Ohio.
11. Massachusetts Dept. of Public Health, 545 State House, Boston, Mass.
12. American Medical Association, Chicago, Ill.
13. Dept. of Public Inst., Territorial Bldg., Honolulu, T. H.

St. Paul Hotel.

14. Murry and Leonie Guggenheim Dental Clinic, 422-428 E. 72nd St., New York City.
15. American Society for the Control of Cancer, New York City.
16. Council on Dental Therapeutics and Bureau of Chemistry, Samuel M. Gordon, Secretary, Chicago, Ill.
17. Carlton College Dental Health Service, Northfield, Minn.
18. Minnesota State Board of Health, St. Paul, Minn.
19. University of Minnesota, School of Dentistry, Minneapolis, Minn.
20. Mayo Clinic, Rochester, Minn.
21. Duluth District Dental Society, Duluth, Minn.
22. Monson Research and Study Club, St. Paul, Minn.
23. F. Denton White, Minneapolis, Minn.
24. H. B. Clark, St. Paul, Minn.
25. Oral Hygiene Program of the St. Paul Schools, St. Paul, Minn.
26. I. A. Epstein, St. Paul, Minn.
27. Carl J. and Carl T. Grove, St. Paul, Minn.
28. Samuel Ziegler, St. Paul, Minn.
29. Minnesota Women's Auxiliary, St. Paul, Minn.

ANNOUNCEMENTS

PAST PRESIDENTS' (A.D.A.) CLUB LUNCHEON

The Past Presidents' Club of the American Dental Association will hold its annual luncheon at 12:30 p.m., Tuesday, August 7, at the St. Paul Hotel, Room 334. The annual address will be delivered by John V. Conzett. Every Past President in attendance at the meeting is urgently requested to be present at this luncheon.

HOMER C. BROWN, *Secretary*,
Columbus, Ohio.

RESEARCH COMMISSION

The Executive Board of the Research Commission will meet at the St. Paul Hotel, August 3 at 11:00 a.m. in Room 334; and August 4-5 at 10:00 a.m. in the same room.

The Research Commission will meet at the St. Paul Hotel, August 6, 7 and 9 at 4:00 p.m.

MOUTH HYGIENE LUNCHEON

The annual Mouth Hygiene Luncheon of the American Dental Association will be held in the Spanish Room of the Lowry Hotel, Wednesday, August 8, at 12:15 p.m. The speaker will be Sen. Henrik Shipstead, of Minnesota. Tickets will be on sale at the Auditorium and the Lowry and St. Paul hotels for $1.00. Tickets may be purchased in advance by writing the chairman of the Health Exhibits Committee, 364 Lowry Building, St. Paul, Minn. Enclose check or money order.

E. L. PETTIBONE, *Chairman.*

CONFERENCE OF DENTAL HEALTH WORKERS

The annual Conference of Dental Health Workers will be held Tuesday morning and

each following morning of the meeting from 8 to 9 a.m., with breakfast in Room 334, St. Paul Hotel.

STAG PARTY

The Minnesota State Dental Association will entertain the American Dental Association at a stag party in the Auditorium, Wednesday evening, August 8, immediately after the Third General Session.

COMMITTEE FOR DENTAL HEALTH SURVEY

The Committee for Dental Health Survey will meet Sunday, August 5, at 3:00 p.m. in Room 334, St. Paul Hotel.

Commodore Hotel.

ROUND TABLE

The Dental Auxiliary of the Minnesota State Dental Association plans to conduct a round table from 10 a.m. to 12 m. during the four days of the Convention, at the Municipal Auditorium. During the past ten years, the Minnesota Dental Auxiliary has been active in various philanthropic projects. At the round table, all phases of auxiliary work will be discussed. Topics will include: organization of dental auxiliaries in urban and rural districts; child hygiene and the cooperation of the parent-teacher association and other agencies in the roundups; surveys and dental contests; work with public health nurses and school officials in caring for the underprivileged children; school dental clinics in St. Paul, and organization management and types of work.

NATIONAL BOARD OF DENTAL EXAMINERS

The National Board of Examiners will meet August 7 and 10 in the Green room, Lowry Hotel.

ASSOCIATION OF AMERICAN WOMEN DENTISTS

The annual meeting of the Association of American Women Dentists will be held August 6, at the St. Paul Hotel, Room 334, with a breakfast from 8 to 9, Monday a.m.; a business meeting from 10 to 12 a.m., and a banquet in the evening in the Windsor Room.

E. PEARLE BISHOP.

Ryan Hotel.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS

The National Association of Dental Examiners will hold its annual meeting in the Old Colony Room, St. Paul Hotel, August 4, at 9:00 a.m. Luncheon will be served in the Windsor Room.

ASSOCIATION OF MILITARY DENTAL SURGEONS

The annual meeting and banquet of the Association of Military Dental Surgeons will be

held August 8 at 6:00 p.m. in the Windsor Room, St. Paul Hotel.

AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS

The sixteenth annual meeting of the American Society of Oral Surgeons and Exodontists will be held August 3 and 4, at the Ramsey County Medical Library, Lowry Bldg., St. Paul. The banquet will be given in the Spanish Room of the Lowry Hotel, which is headquarters for the Society.

AMERICAN ACADEMY OF PERIODONTOLOGY

The meeting and banquet of the American Academy of Periodontology will be held August 3 and 4, at the Minnesota Club.

Lowry Hotel.

AMERICAN FULL DENTURE SOCIETY

The meeting of the American Full Denture Society will be held Agust 4-5, in the Spanish Room, Lowry Hotel, closing with a banquet.

AMERICAN SOCIETY FOR THE PROMOTION OF CHILDREN'S DENTISTRY

The American Society for the Promotion of Children's Dentistry will meet August 6, at the St. Paul Hotel, Old Colony Room, with luncheon in the Windsor Room.

THE AMERICAN ACADEMY OF RESTORATIVE DENTISTRY

The 1934 meeting of the American Academy of Restorative Dentistry will be held at St. Paul District Dental Society Library, Lowry Building, St. Paul, Minn., August 3-5. Luncheon will be at the Lowry Hotel.

STATE SOCIETY OFFICERS' CONFERENCE

The annual Conference of State Society Officers and the Officers and Board of Trustees of the American Dental Association will be held August 5 (Sunday) at 10:00 a.m. This meeting will continue throughout the day. There will be no evening session.

AMERICAN DENTAL HYGIENISTS' ASSOCIATION

The annual meeting of the American Dental Hygienists' Association will be held in the St. Francis Hotel, August 6-10. The annual banquet will be held Tuesday, August 7.

AGNES G. MORRIS, *Secretary,*
Bridgeport, Conn.

Hotel St. Francis.

AMERICAN DENTAL ASSISTANTS ASSOCIATION

The tenth annual meeting of the American Dental Assistants Association will be held in the Empire Room of the Hotel St. Francis, August 6-10. An informal banquet, which all friends of the organization are invited to attend, will be held Wednesday evening, August 8, in the Empire Room.

RUTH M. CLARK, *Secretary,*
Scofield Bldg., Minot, N. D.

AMERICAN COLLEGE OF DENTISTS

The American College of Dentists will meet August 5 in the Old Colony Room of the St.

Paul Hotel. The banquet will be given in the Palm Room of the hotel.

AMERICAN ASSOCIATION OF DENTAL EDITORS

The American Association of Dental Editors will meet in the Colonial Room of the Lowry Hotel, Saturday, August 4. Dinner will be served in the Colonial Room.

O. W. BRANDHORST, *Secretary.*

NATIONAL ASSOCIATION OF DENTURE PROSTHETISTS

The National Association of Denture Prosthetists will meet July 30 at the University of Minnesota Dental School. August 4, a banquet will be given at the St. Paul Hotel.

AMERICAN SOCIETY FOR THE ADVANCEMENT OF ORAL DIAGNOSIS

The American Society for the Promotion of Oral Diagnosis will meet August 6 in the Colonial Room, Lowry Hotel.

VETERANS OF THE MINNESOTA STATE DENTAL ASSOCIATION

The Veterans of the Minnesota State Dental Association will meet August 6.

UNIVERSITY OF PENNSYLVANIA ALUMNI ASSOCIATION

The University of Pennsylvania Alumni Association will be held August 8, with luncheon in the Windsor Room, St. Paul Hotel, at 12 m.

AMERICAN DENTAL GOLF ASSOCIATION

The fifteenth annual tournament of the American Dental Golf Association will be held Monday, August 6, as follows: Class "A" at Town and Country Club; Class "B" at White Bear Yacht Club; Class "C" at Midland Hills Country Club. Numerous fine prizes for all classes will be given. The Calcutta Pool dinner will be held Sunday evening, August 5, at the Lowry Hotel, in the Spanish Room.

TRAP SHOOTERS LEAGUE OF THE AMERICAN DENTAL ASSOCIATION

The Trap Shooters League of the A.D.A. will meet August 5-6, at the Twin City Gun Club. The park will be open on Sunday for practice. All trophy and prize winners must be prepared to show 1934 cards.

BILL JORDAN, *National Secretary.*
Kansas City, Mo.

PSI OMEGA FRATERNITY NATIONAL ALUMNI CHAPTER

The annual meeting of the National Alumni Chapter of Psi Omega will be held in the Lowry Hotel, Tuesday morning, August 7. The annual banquet will be given Monday night, August 6, at 7:00 p.m., at the Lowry Hotel. Registration and headquarters will be at the Lowry Hotel.

WALTER T. MCFALL, *Grand Master,*
Macon, Ga.

DELTA SIGMA DELTA FRATERNITY

The fiftieth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Lowry Hotel, Monday, August 6. The first session will be held at 9:30 a.m., followed by the usual complimentary luncheon to members, after which the afternoon session will be held. The annual banquet will take place at 6 p.m. When registering for the banquet it will be necessary to present membership card to the committee in charge, of which L. G. Lafreniere is chairman.

By Order of the Supreme Council

FRANK A. DELABARRE,
Supreme Grand Master.

ALPHA OMEGA FRATERNITY

The Alpha Omega Fraternity will be held at the Lowry Hotel, August 6, with the annual banquet at 6:30 p.m. The Lowry Hotel is headquarters for the fraternity.

OMICRON KAPPA UPSILON FRATERNITY

The annual luncheon of the Omicron Kappa Upsilon Fraternity will be given Tuesday, August 7, in the Spanish Room, Lowry Hotel.

ABRAM HOFFMAN, *Secretary.*

XI PSI PHI FRATERNITY

Xi Psi Phi annual banquet will be held August 6, at 6:30 p.m. in the Spanish Room of the Lowry Hotel. All members of the fraternity and their wives are cordially invited to be present. (Informal.)

J. EMMETT NORTHCUTT, *Supreme President,*
Kansas City, Mo.

RAILROAD RATES TO ST. PAUL, MINN.

The American Dental Association has discontinued the use of the Identification Convention Certificate, and again this year is using the "Certificate Plan." The certificates will be obtainable from your railroad agent, and NOT THROUGH THIS OFFICE. Following is full information regarding the plan.

The following directions are submitted for your guidance:

1. Be sure that when purchasing going ticket you request a CERTIFICATE. *Do not make the mistake of asking for a "Receipt."*

2. Present yourself at the railroad station for tickets and Certificates at least 30 minutes before departure of train on which you will begin your journey.

3. *Certificates are not kept at all stations.* If you inquire at your home station, you can ascertain whether Certificates and through tickets can be obtained to place of meeting. If not obtainable at your home station, the agent will inform you at what station they can be obtained. You can in such a case purchase a local ticket to the station which has Certificates in stock, where you can purchase a through ticket and at the same time ask for and obtain a Certificate to place of meeting.

4. *Immediately on your arrival at the meeting present your Certificate* to the endorsing officer, Dr. Albert Hallenberg, Vice-President, as the reduced fares for the return journey will not apply unless you are properly identified as provided for by the Certificates.

5. *It has been arranged that the Special Agent of the Carriers will be in attendance on August 7 to 10 from 8:30 a.m. to 5:30 p.m., to validate Certificates.* If you arrive at the meeting later than August 9, after the Special Agent has left, you cannot have your Certificate validated and consequently you will not obtain the benefit of the reduction on the home journey.

6. Certificates issued to children at half fares will be counted the same as Certificates held by adults.

7. If your Certificate is duly validated, you will be entitled up to and including August 14 to a return ticket via the same route over which you made the going journey *at one-half of the regular one-way tariff fare* from the place of meeting to the point at which your Certificate was issued. *(The identical route must be used in going and in returning in order to benefit under the Certificate plan.)*

8. Return tickets issued at the reduced fares will not be good on any limited train on which such reduced fare transportation is not honored.

9. *No refund of fare will be made on account of failure to obtain proper Certificate when purchasing going tickets, nor on account of failure to present validated Certificate when purchasing return ticket.*

A program of exceptional merit has been arranged, and we extend to you a cordial invitation to be present.

N.B. Summer Excursions fares, which in some cases are lower than Convention fares, will apply from some territories. Be sure to inquire of ticket agent which fare is lower.

Transportation Committee

R. L. SPRAU,
O. J. SPECKER,
E. J. JUSTIS,
ALBERT HALLENBERG,
H. B. PINNEY, *Chairman*,
212 East Superior Street, Chicago, Ill.

RAILROAD SELLING DATES

TRANS-CONTINENTAL PASSENGER ASSOCIATION
WESTERN PASSENGER ASSOCIATION

Sale dates for Colorado (Julesberg only), Illinois, Iowa, Kansas, Manitoba (see note), Minnesota, Missouri, Nebraska, Northern Michigan, North Dakota, South Dakota, Wisconsin ..... July 31-Aug. 6, Incl.

Colorado (except Julesberg), Wyoming ..... July 30-Aug. 5, Incl.

Arizona, British Columbia, Northern Idaho, Montana, Nevada, New Mexico, Utah, Oregon, California, Washington ..... July 28-Aug. 4, Incl.

Montana and Southern Idaho ..... July 29-Aug. 5, Incl.

NOTE—Manitoba (on Great Nor., Nor. Pac. and M., St. P. & S. S. M. Rys., also from Winnipeg via Can. Nat'l and Can. Pac. Rys.)

Final honoring date ..... Aug. 14, 1934

SOUTHEASTERN PASSENGER ASSOCIATION

Sale dates for points in territory (south of the Ohio and Potomac and east of the Mississippi Rivers) ..... July 31-Aug. 6, Incl.

Final honoring date ..... Aug. 14, 1934

NEW ENGLAND PASSENGER ASSOCIATION

Sale dates for points in territory (New England) ..... July 31-Aug. 6, Incl.

Final honoring date ..... Aug. 14, 1934

SOUTHWESTERN PASSENGER ASSOCIATION

Sale dates for Oklahoma, Texas ..... July 31-Aug. 6, Incl.

Arkansas, Kansas, Louisiana, Missouri, also Memphis, Tenn., and Natchez, Miss. ..... Aug. 1-7, Incl.

Final honoring date ..... Aug. 14, 1934

CENTRAL PASSENGER ASSOCIATION AND TRUNK LINE ASSOCIATION

Sale dates for points in territory (East of and including Chicago and St. Louis north of the Ohio and Potomac rivers to the Atlantic Seaboard, south of New England and Canada) ..... Aug. 1-7, Incl.

Final honoring date ..... Aug. 14, 1934

CANADIAN PASSENGER ASSOCIATION

Sale dates from British Columbia ..... July 29-Aug. 6, Incl.

From Alberta ..... July 31-Aug. 6, Incl.

From Saskatchewan, Manitoba and Ontario (West of Port Arthur and Armstrong) ..... Aug. 1-7, Incl.

Final honoring date ..... Aug. 14, 1934

VALIDATING DATES AUG. 7-9

Cabin in woods near St. Paul.

AMERICAN DENTAL ASSOCIATION

St. Paul, Minn. Aug. 6-10, 1934.

HOTEL RESERVATION

In securing hotel reservations for the 1934 Session, consult the hotel rate-sheet and fill out the blank application below. Mail immediately to the hotel you wish to patronize. The hotel will then advise you of the reservation which has been made for you.

In case your first choice is not available, kindly indicate a second and a third choice. If none of these are available, the hotel manager will mail your application to the Chairman of Halls & Hotels Committee, who will make as favorable reservation for you as possible.

Please remember that a reservation constitutes a contract with the hotel to provide you with the accommodations you desire. If you find it impossible to carry out your part of the contract, namely, to occupy the room at the time agreed on, please write or wire the hotel, releasing the room reserved for you in order that it may be available to others attending the meeting.

MAIL THIS APPLICATION DIRECT TO THE HOTEL

HOTEL RESERVATION

AMERICAN DENTAL ASSOCIATION, ST. PAUL, MINN., AUGUST 6-10, 1934.

.....Hotel.

St. Paul, Minn.

Please reserve sleeping accommodations as noted below:

.....Room (s) With bath for.....people. Rate desired per day $.....

.....Room (s) Without bath for.....people. Rate desired per day $.....

Second choice hotel..... Third choice hotel.....

ROOMS TO BE OCCUPIED BY:	ADDRESS IN FULL
Applicant.....	.....
.....	.....
.....	.....
.....	.....

Please confirm this reservation to applicant. I further agree to notify the hotel at once in the event I am unable to use this reservation.

IMPORTANT TO HOTEL MANAGER: In the event you cannot accept this reservation, please forward this application at once to Dr. E. J. Simon, Chairman Halls & Hotels Committee, 364 Lowry Medical Arts Bldg., St. Paul, Minn., who will attend to the assignment of this reservation.

HOTEL	With Bath One Person	With Bath Two Persons	Without Bath One Person	Without Bath Two Persons
ANGUS 165 Western Ave.	$2.50-3.00 3.50	$3.50 4.00	$1.50 2.00	$2.50 3.00
ASTORIA 374 Wabasha St.	2.00-2.50	3.00-3.50 4.00-4.50	1.00	1.50
COMMODORE 79 Western Ave.	2.50-3.00 3.50-4.00 4.50-5.00	4.00TB*-4.50TB 5.00TB-5.50TB 6.00TB		
EUCLID 405 N. Washington St.	2.00-3.00	3.00-4.00-4.50	1.25	2.00
FREDERIC 45 East 5th St.	2.00-2.50	3.00-3.50-4.00	1.25-1.50	2.00-2.50
HOTEL JEWELL 17 East 5th St.	2.00-2.50	3.50-4.00	1.00-1.50	1.50-2.00-2.25
HOTEL ST. FRANCIS 7th & Wabasha	2.50-3.00 3.50	4.00-4.50-5.00TB 5.50TB-6.00TB		
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George A. Ellsperman, Bellingham Nat'l Bank Bldg., Bellingham
J. E. Argue, Fourth & Pike Bldg., Seattle
J. T. Ryan, Mt. Vernon
C. E. Wilbur, 903 Fidelity Bldg., Tacoma

WEST VIRGINIA

Delegates

E. D. Douglas, Parkersburg
Howard E. Summers, Huntington
J. B. Poindexter, Huntington

Alternates

C. M. Jividen, Charleston
R. D. Watkins, Chester

WISCONSIN

Delegates

R. W. Huegel, 703 Tenney Bldg., Madison
T. A. Hardgrove, Fond du Lac
G. W. Wilson, 5708 Washington Blvd., Milwaukee
N. E. Uelmen, 324 E. Wisconsin Ave., Milwaukee
R. W. Baldwin, Viroqua
C. F. Clark, Menomonie

Alternates

C. A. Nelson, Amery
G. A. Le Sage, 1320 Tower Ave., Superior
W. G. Morrisey, Reedsville
F. J. Marton, Medford
M. S. Huxtable, Mineral Point
F. A. Bull, 1134 State St. W., Milwaukee

ARMY

Delegate

George D. Graham, General Dispensary, U. S. Army, Post Office Bldg., Chicago, Ill.

Alternate

Arne Sorum, Fort Snelling, Minn.

NAVY

Delegate

Cornelius H. Mack, U. S. Navy Yard, Mare Island, Calif.

Alternate

Robert H. Fladeland, U. S. Naval Hospital, Washington, D. C.

U. S. PUBLIC HEALTH SERVICE

Delegate

C. T. Messner, U. S. Public Health Service, Washington, D. C.

Alternate

C. W. Wekenman, U. S. Marine Hospital, Chicago, Ill.

U. S. VETERANS ADMINISTRATION

Delegate

Milburn M. Fowler, Veterans Administration, Washington, D. C.

Alternate

Paul H. Eggena, Veterans Administration Facility, Minneapolis, Minn.

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

Leukoplakia Buccalis and Keratosis Labialis (Somers H. Sturgis and C. C. Lund, New England J. Med., May 10, 1934): The etiologic history includes consideration of syphilis, tobacco, dissimilar metal fillings, food allergy, rough, jagged fillings, chronic infections from dirty mouths, chronic gingivitis, ill fitting dentures (some authors saying that dental infection was the only cause), hyperacidity and lack of vitamins. Essentials of diagnosis are said to be as lacking as when Levy wrote twenty years ago. The study given in this report is based on 520 patients observed over a period of eight years. Tables to show the dental condition, the incidence of syphilis, of leukoplakias that developed cancer and those that did not is given. Methods of treatment are included in the report such as elimination of tobacco, smoothing or removing teeth, adjustment or remaking of dentures and improved oral hygiene. The conclusions from the study are that leukoplakia and keratosis labialis are definitely precancerous lesions; that bad dental hygiene and the use of tobacco (91 per cent in this survey were males) are important etiologic factors; that syphilis is found in 30 per cent of sufferers from these diseases. The location of the lesion has no prognostic importance, nor does duration of the lesion before treatment have any definite bearing on the results of treatment.

Vital Reactions of the Pulp of Teeth in Syphilis Produced by Induced Currents—A Preliminary Report of One Hundred and Ten Cases (William R. Pentz, Arch. Phys. Ther. X-Ray Rad., April, 1934; abstr. Arch. Derm. & Syph., August, 1933): The apparatus used is the ordinary laboratory 2 volt dry cell, connected with a common induction coil which is so arranged that the voltage may be increased or decreased as desired. It is the ordinary coil used in laboratories, at one end of which a make and break key or vibrator is attached. The electrodes are of the common two point type. The dry cells are changed every three months to insure the use of a standard voltage at all times. The method of testing the teeth is simple. After the current is turned on, the smallest amount of current necessary to cause a sensory reaction of the pulp is used. This is done for each tooth, and the result is tabulated immediately. Only teeth free from fillings and caries are tested, in order to avoid any hypersensitivity or lessening of the sensory activity. Hopewell-Smith contended that caries and fillings in teeth produce pathologic changes in the pulp and hence change sensitivity. The teeth used in this test are those from the second bicuspid to the second biscuspid, inclusive, in both the upper and the lower jaw. The controls were teeth of normal persons; the teeth selected were the same and answered the same requirements. The students of the Temple University School of Medicine submitted to the control tests. Pentz arrives at the following conclusions: 1. In normal persons, there is a variation in the pulp of the teeth which falls within definite limits. 2. In syphilitic infection, the secondary stages show a definite variation in some persons that is not paralleled in others. 3. Patients with congenital syphilis are not all dentally affected by the disease. The question as to why this should be so gives us an interesting field for speculation on which some light may be thrown by experimentation with animals. 4. An unexplained vari-

ation in the reactions of the pulp occurs in secondary syphilis. 5. The results up to this time indicate that in persons with secondary syphilis whose dental pulp varies greatly from the normal, the infection may have a distinct predilection for nerve tissue and may tend toward neurosyphilis as its ultimate manifestation.

Cause of Trigeminal Neuralgia (W. E. Dandy, Am. J. Surg., May, 1934): Dandy noted various anatomic conditions which he believed might cause trigeminal neuralgia. From a series of 215 cases, he made the following notes: In twelve cases, there was a gross lesion impinging on the nerve. Six of these tumors were ordinary acoustic neuromas. One was of a different type, arising from the eighth nerve. Four were cholesteatomas. The other was an osteoma arising from the base of the skull. In six cases, aneurysms of the basilar artery pressed on the sensory root. He calls attention to the frequency of this lesion. In five cases, cavernous angiomas surrounded the sensory root. Other findings that he deemed less imperative were arteries and veins that frequently impinge on and distort the sensory root. Another group of cases showed a branch of the petrosal vein, which frequently indents the nerve or is firmly attached to it. Malformations of the base of the skull may be responsible. In seven cases, the sensory root was tightly adherent to the brain stem. One patient had multiple sclerosis. In eighty-seven cases, no gross findings were noted, but the author suggests that the entire extent of the sensory root is not visible from the operative field.

Possible Sources of Calcium and Phosphorus in the Chinese Diet (Pik-Wan Hoh, J. C. Williams and C. S. Pease, J. Nutrition, May 10, 1934): Because the Chinese use milk only for invalids and children as a dietary practice, continuous interest has been drawn to this subject. These workers discuss their experiments and give six tables to show their results. An analysis of common Chinese foods was made, the calcium-phosphorus content before and after cooking being noted. The basic question as to whether calcium and phosphorus are as assimilable from the foods examined as from milk and cheese remains open. The authors advise that biologic experiments on animals and human beings be further developed to determine how the above-named elements from these sources are metabolized.

Hereditary Ectodermal Dysplasia of the Anhidrotic Type (J. M. Hiebett and J. Garland, New England J. Med., April 12, 1934): The authors discuss hereditary ectodermal dysplasia, giving the findings of Clouston, Goeckermann, McKee and Andrews; likewise, the parental history of the case reported. The patient, a boy, aged 5 years, cut his first tooth at 11 months, but has only two cuspids in the mandible; and one incisor, two cuspids and two molars in the maxilla. All the teeth are tusk-shaped. The patient never perspires; his hair is fine and sparse, and he has no eyebrows and only scattered lashes. He has chronic rhinitis and a hoarse voice and suffers from attacks of complete aphronia. The skin is parchment like. Mentally, the boy responds as a normal, happy, alert child.

Determination of Carotine in Butter Fat (H. M. Barnett, J. Biol. Chem., May 1934): Since the discovery that carotine is converted into vitamin A in the animal organism, the importance of accurate determination of carotine in butter has increased. Barnett made calorimetric and spectrophotometric determinations. These determinations made on five samples of butter fat showed results ranging from 7.3 to 13.0 mg. of carotine per kilogram of butterfat.

Clinical Review of the Interrelation between Caries and Pyorrhea (J. G. Turner, Brit. D. J., April 16, 1934): Turner observes that "abroad" caries and pyorrhea are said to be antagonistic. He contends that in England this is not true in his experience. Among people who live similarly, the diseases run parallel. In Morocco and in India, pyorrhea is rampant, but caries is less extensive. The author says that under the conditions of our civilization, the diseases are concurrent and are due to the same conditions. He discusses the age limits of the diseases, the arrest of caries

and the rate of progress of caries—a much neglected phase. He calls attention to the bacterial (leptothrix) content of serumal calculus. Pyorrhea is to be found when serumal tartar is entirely absent. He contends that pyorrhea is associated with absorption and deposition of bone and cementum, as witness hypercementosis. He finds it impossible to reconcile these facts with "unloading" of calcium by over-alkalinized blood. Mentioning mouth secretions and mucous, the latter the lubricant of oral tissues, teeth and pocket walls, he concludes "we may possibly find a clue to the origin of pyorrhea and caries in the varying output and composition of mucous."

Foreign Literature

Questionnaire on Dental Practice by the Statistician (D. J. Australia, March 1, 1934): The purposes of the inquiry were: 1. To investigate the economic circumstances of dentists throughout Australia. 2. To assemble a body of information that would act as a guide to young dentists about to begin practice or young persons intending to study the same. 3. To point out the care or carelessness of dentists in the economic side of their practice and if possible to incite an introspective study of their business by the Australian dentists in the light of the information revealed. 4. To reveal the necessity or otherwise of economic instruction in the dental courses at the Australian universities.

Acriflavine, with Special Reference to Vincent's Angina (G. E. Wilson, D. Rec., May, 1934): Dr. Wilson suggests a list of the common antiseptics used in dentistry, such as phenol, the creosotes, iodine and chlorine derivatives, and calls them "antiseptics of comparatively low potency." Those that give off nascent oxygen he calls "comparatively worthless." The action of an antiseptic may be altered by contact with serum. Iodine, the chlorine derivatives and the mercurials are changed in the presence of serum; but the potency of acriflavine is increased by contact with serum. Acriflavine is also nonirritating. It is most penetrating in going through the dental tubules to their surface termini. It has a low toxicity to mammalian tissues. Acriflavine does not even prevent mitosis. When it was used for Vincent's infection in 1:1,000 strength, the condition cleared rapidly.

Some Observations on Silicate Cements (Ernest Matthews, Brit. D. J., May 1, 1934): The composition of silicate cements from the standpoint of chemical analysis is given. Their irritant action is discussed and a complete history giving their porosity as shown by experiment is detailed. Some are penetrated by dyes; others partially, and still others not at all. In almost all cases, the dye passes between the filling and the walls of its container. The solubility of these materials were tested and tables given.

Use of Formalin in Conservative Dentistry (Bálint Orbán, Ztschr. F. Stomatol., Vol. 32, 1934, pp. 308-318, 388-402, 434-451, 504-523): The literature deals with the use of formalin in stomatology since 1894. At first, it was used in the treatment of pulpitis; later, in pulp amputation, the treatment of gangrene, anesthetization of the dentin, devitalization and treatment of the gums. The author claims that the use of formalin is repudiated because of its use in improper dosage. After the use of a from 1 to 5 per cent paraformaldehyde-aquadont filling in dogs, a secondary dentin formation can be observed in from three to five months. Using a 1-2 per cent solution of the foregoing causes a locally circumscribed secondary dentin formation; while greater doses cause a diffuse seconday dentin formation in the whole coronal portion of the pulp. As far as the destruction of the pulp is concerned, the following reactions were observed: 1. The odontoblasts opposite the cavity were flattened. 2. Some of them were enclosed in the newly formed dentin. 3. The pulp tissue often showed signs of atrophy. 4. Inflammatory reactions with these low doses were not observed; if any occurred, they healed readily. Secondary dentin formation was found after the use of from 10-20 per cent paraformaldehyde-aquadont fillings for from one to five days. After 20-25 per cent concentrations were used for

from three to four months, metaplastic changes of the pulp were observed, with bone deposits on the inner wall of the dentin, and formation of bony islands in the altered pulp. After from one to eleven days, 20-25 per cent concentrations of paraformaldehyde-aquadont caused hemorrhage and inflammation, with all the changes of a protective reaction on the part of the tissue. The author claims that paraformaldehyde is a practical mixture with temporary filling materials. The concentrations should be from 2-6 per cent, according to the age of the individual and the depth of the cavity. Using the paraformaldehyde as a mixture with the temporary filling reduces the sensitivity of dentin and causes secondary dentin formation in the pulp, and the arrest of the bacteria of caries can also be counted on.

Splenomegaly, Gaucher Type (Peter Kranz, Vierteljsschr. Zahnheilk. 1933, 3): The author describes a rare disease of the spleen and liver which manifests itself by prolonged, steady, excessive bleeding of the gums and gum tissue proliferation. The treatment of this condition requires immediate removal of the spleen.

Sarcomatous Granuloma—Pseudosarcoma—of the Jaws (G. Axhausen, Deutsche Kieferchir. 1934, pp. 79-114): Besides the giant-cell tumors, there exists also another important form of unspecific granulation tumor of the jaws. The author reports seven observed cases. This type of tumor has no resemblance to the giant-cell granuloma. It consists of two parts: 1. A plain granulation structure. 2. A typical transition of this structure to a mixture of spindle and round-cell mesenchymal elements. In regions of the greatest number of mitoses, there occur great areas of spindle or round-cell sarcomas. Histologically, those tumors do not know the spontaneous necrosis and clear staining properties as seen in the transition of pure granulation structures into sarcomatous elements. The pseudosarcomatous granuloma resembles the giant-cell granuloma in that it has a peripheral and central zone, an unlimited growth and a most fatal effect on the bone. It differs from a giant-cell tumor in that it is of extremely soft consistency, it fluctuates and it is very sensitive to irradiation. Under irradiation, there is rapid tumor reformation. The treatment consists in repeated resection followed by plastic surgery. Pseudosarcomatous granulomas were up till now diagnosed clinically as sarcomas. This research proves that one should not give a false prognosis in cases of rapidly growing, very soft and bone disturbing tumors. One should determine histologically whether the tumor is not a pesudosarcoma. There is also the possibility of the occurrence of the same type of tumor in other bones.

Experiments on Saliva (C. Nasslund, Paradentium, 6, 1934, pp. 25-34): The author reports that his experiments on the neutralizing powers of ordinary saliva in comparison with purely synthetic buffer solutions show that human saliva is not influenced by acid stimulations in the mouth. Saliva is also an important protective mechanism against decalcifying effects of fruit acids and other weak acids on the enamel and tooth-filling materials. This protective mechanism is derived from the buffer substances present in the saliva. This buffer property is an explanation of the fact that the tooth substance has a steady resisting power to the action of the free acids of fruit and milk, and this resistance of the enamel to the action of free acids of foods and drinks is not only due to the salivary buffer action, but also to various other factors which may be connected with the tooth enamel of all animals that receive naturally rich acid foods.

Focal Infection of Tonsillar and Dental Origin (Reidar Gording, Norske Tannlaegefor. Tid., February, 1934, p. 38): It is Dr. Gording's opinion that there exists a "focal infection complex": general malaise, nervousness (particularly in women), intermittent fever, headache, and rheumatic pains. Naturally, such symptoms may arise from many other conditions; but after elimination of all other possibilities and with a positive blood picture—a very slight increase in the white count and, the most

important point, a definite "shift to the left" of the neutrophilic blood picture—removal of the possible focus or foci is indicated. The author recognizes the impossibility of making any absolutely definite rules, but insists that the large percentage of cases in which the blood picture became normal after extraction of teeth or removal of tonsils is a proof of its usefulness as an important diagnostic method.

Focal Infection (Haakon Bjorn Hansen, Norske Tannlaegefor. Tid., February, 1934, p. 51): Dr. Hansen discusses the importance of the blood picture as a means of diagnosis in conditions that might arise in focal infection. Although not infallible, it is very useful in differentiating between infectious and noninfectious rheumatic diseases. He uses the Schilling-Arneth method of counting the neutrophiles, myelocytes, metamyelocytes and an increase in the band forms in favor of the segmented neucleated forms, is considered a sign of infection. This "shift to the left" in the blood picture takes place before any increase in the leukocyte count is noticeable and before any other signs of infection, temperature rise and increased pulse are found. A negative blood picture is sometimes found in definite cases of focal infection, but the author stresses the fact that on account of the difficulty of making the Schilling differential count, an error should always be considered and a new count should be made. It is Dr. Gording's opinion that the whole picture of focal infection still is largely in the dark, and that when suitable diagnostic methods are developed, it will be found that even focal infections and endocrinologic disturbances might be connected in many cases. At present, he thinks that the dental profession can do important work in the direction of prophylactic treatment of focal infections in the care of devitalized teeth.

Dental Manifestations of Congenital Syphilis (Dr. Vais, L'Odontologie, April 30, 1934): The subject of dental manifestations of congenital syphilis has been a controversial one for many years. The author admits that syphilis, which is an infectious and contagious disease, may produce buccodental changes. The same changes may be encountered in other cases wherein syphilis is not present. He raises the question as to whether there are certain oral dystrophies which belong exclusively to congenital syphilis. He lists and discusses certain factors which he believes may qualify the definite responsibility of syphilis: (1) atavism; (2) heredity; (3) diseases and infections of the progenitors such as alcoholism, lead and mercurial poisoning and tuberculosis; (4) diseases of early infancy which react on the development of teeth; (5) artificial feeding; (6) vitamin deficiency, and (7) disturbance in the endocrine functions. The only dystrophy which he admits may be pathognomonic of syphilis is Hutchinson's teeth and he says it becomes a relative certainty if the other signs of Hutchinson's triad are present. The author concludes that the buccodental manifestations of syphilis are not yet definitely determined.

Experimental Researches on Root Therapy with Special Reference to Colloidal Treatment and the Efficacy of Aseptic Work in the Care of the Roots (S. Palazzi, Rev. Odontologique, April, 1934): The author performs his experiments with colloidal treatment on roots of dogs' teeth, which he believes to approximate closely conditions in human beings. He uses the same medieval elements which are used in men with appropriate dosages. After a previous application of arsenic, the pulp is removed and the root canal is filled with silver paste and a rubber cone. All of this is done under aseptic conditions. The animals were killed then and histologic studies made. Certain other series of experiments have been seen under nonsterile conditions which are similar in technic to those of many practitioners, the author says. The difference in results of these two series shows significantly the advantage of a sterile technic. The author presents twenty-three microphotographs with explanation in the text showing the results of his experiments. He concludes that colloidal therapy under aseptic conditions is tolerated perfectly by the periapical zone.

NEWS

CALIFORNIA

Dr. McGee Addresses Medical Group: Rea Proctor McGee addressed the Hollywood Academy of Medicine April 19 on "Interrelationship of Medicine and Dentistry."

The Dental Protective Legislative Alliance: Satisfactory progress is being made in the enrollment of members; not only those dentists associated with organized dentistry, but many nonmembers are becoming alined with the Alliance. The Alliance presents the first opportunity in the history of dentistry in California to the ethical nonmember of organized dentistry to participate in any way as a group in protecting through legislation the welfare of the people of California and members of the dental profession.

Pasadena Central Health Bureau: The Pasadena Central Health Bureau was organized for the purpose of arranging medical, dental and nursing care at reduced rates, consistent with the means of Pasadenans unable to pay the customary rates, and the Pasadena branch of the Los Angeles County Medical Association, the Pasadena District Dental Society, the Nursing Association and hospitals are behind the plan. Health agencies cooperating in the project include the city health department, Pasadena City Schools Welfare Department, Pasadena Association of Pharmacists, District No. 22, California Nurses' Association, La Vina Sanitarium, Pasadena Chest Clinic, Pasadena Hospital Dispensary, Visiting Nurses' Association, Convalescent Aid Society, Pasadena Hospital, St. Luke Hospital, Woman's Hospital, the county welfare department, and the county hospital.

ILLINOIS

Phi Beta Pi Medical Fraternity Lectureships: Delta Chapter of Phi Beta Pi Medical Fraternity takes pleasure in announcing the establishment of an annual lectureship at the University of Chicago Medical School in honor of Arno B. Luckhardt, professor of physiology, and president of the American Physiological Society. Dr. Luckhardt is well known the world over for his valuable studies on parathyroid functions, tetany and epinephrine, and especially for his introduction of ethylene as a useful clinical anesthetic. A graduate of Rush Medical College in 1912, Dr. Luckhardt has been associated in teaching and research at the University of Chicago since 1907. His influence has been very great not only in physiologic circles, but also in medical and dental fields. He has served on many important committees for the American Medical Association, and he is a councilor on dental therapeutics for the American Dental Association. Dr. Luckhardt's cultural interests are unusually broad, and he has aroused much enthusiasm among his pupils for medical history and the history of science. He collaborated with Prof. Breasted in annotating the great Edwin Smith Surgical Papyrus, which was so beautifully published by the University of Chicago Press in 1928. Delta Chapter hopes to express its appreciation of Dr. Luckhardt's inspiration by the establishment of an annual lectureship in his honor.

Dr. Ryan Edits Bulletin: Edward J. Ryan, editor of *Oral Hygiene, Dental Digest* and *Proofs,* has been made editor of the *Bulletin of the Chicago Dental Society.*

State Society Elects Officers: At the seventieth annual meeting of the Illinois State Dental Society, held May 8-10, at Springfield, the following officers were elected for the ensuing year: president, John K. Conroy, Belleville; president elect, Percy B. D. Idler, Chicago; vice president,

Ogden B. Munroe, Springfield; secretary, Ben H. Sherrard, Rock Island; treasurer, Burne O. Sippy, Chicago.

MARYLAND

Societies Elect Officers: D. C. Blevins of Centreville was installed as president and F. Noel Smith was made president-elect of the Maryland State Dental Association at its annual meeting, May 8, 1934. C. Adam Bock was elected president and Leonard Davis was made vice-president of the Baltimore City Dental Society at its recent annual business meeting.

MISSOURI

State Association Elects Officers: At the annual meeting of the Missouri State Dental Association held in conjunction with the state associations of Kansas and Oklahoma (the Tri-State Meeting), at Kansas City, Mo., May 6-9, the following were elected officers for the coming year: president, George E. Haigh, Jefferson City; president elect, Virgil Loeb, St. Louis; first vice president, John W. Clayton, Kansas City; second vice president, George T. Reily, Fulton; third vice president, A. W. Herington, Milan; secretary, C. W. Digges, Columbia; treasurer, J. F. McLellan, Moberly; editor, O. W. Brandhorst, St. Louis.

NEBRASKA

Society Reorganized: The North Platte Dental Society has been reorganized as the Lincoln County Dental Society. Newly elected officers are: L. A. Snavely, president; O. H. Cressler, vice-president; H. C. Brock, secretary-treasurer.

Resolution of Lincoln County Society: Lincoln County Dental Society has addressed resolutions to the county commissioners as follows:

WHEREAS, the County Commissioners of Lincoln County, State of Nebraska, recognize the need for medical and dental aid for those people in said county upon the relief roll, and,

WHEREAS, provisions have been made by the county commissioners for the granting of medical aid through the appointment of a county health officer of the medical profession, and,

WHEREAS, dentistry is a natural division of health service, and is increasingly becoming recognized as indispensable in any modern public health program, and,

WHEREAS, no such officer from the dental profession has been appointed to act in an advisory capacity as to recommending the services required of those in dental distress, and,

WHEREAS, members of the said dental profession in Lincoln County have too frequently been called on to render services to alleviate suffering and to intercept the ravages of dental disease by the filling of teeth, and treatment of pyogenic conditions of families where the medical doctor was receiving compensation for his services from said county, therefore, be it

Resolved, that said commissioners be requested to appoint a member of the Lincoln County Dental Society to act in the capacity of an adviser to the commissioners for those in need of dental aid, such appointee to be recommended by said society, and be it further

Resolved, that said county commissioners confer with the said dental society relative to types of dental services they should render to those in need and arrange with said society for an equitable fee schedule for same.

Many Dentists Elected to Office: Spring elections in many Nebraska communities elevated numerous members of the dental profession to or retained them in positions of trust and responsibility. A check shows the following offices held: C. C. Lillibridge, treasurer, Crete; W. P. Higgins, board of education, Albion; A. E. Curley, board of education, Seward; L. E. Sayles, city council, Arapahoe; F. O. Raasch, city council, Kearney; H. B. Linch, police judge, Big Springs; C. B. Johnson, mayor, Alma; W. E. Smith, town board; Coleridge; R. L. Minnick, mayor, Stromsburg; C. C. Cundall, board of education, Gothenburg; G. A. Racely, mayor, Crawford; C. V. Graff, mayor, Tecumseh; J. W. Barnes, board of education, Tecum-

seh; W. A. Weber, board of education, Norfolk; C. B. Arnot, board of education, Humboldt; I. B. Mowry, board of education, Humboldt.

NEW YORK

New York Dental Centennial: Because of conflict with a projected celebration of the founding of American Dentistry to be held in 1939, it has been decided to change the name of "The Centennial of an Organized Dental Profession" to "New York Dental Centennial."

OHIO

Registrar of Dental School Made Medical Registrar: Rev. J. F. Berry, formerly registrar of Western Reserve University School of Dentistry has been appointed registrar of the School of Medicine at the University.

Drs. Tisdall and Hoskins Speak Before Pediatric Society: Frederick F. Tisdall of Toronto, Ont., and Roy G. Hoskins, Boston, spoke on "Dental Caries and Ductless Glands" at the American Academy of Pediatrics in Cleveland, June 11-12.

PENNSYLVANIA

Dr. Prinz Receives Jenkins Medal: Hermann Prinz, on April 18, received the Newell Sill Jenkins Memorial Medal, which is awarded each year to the person who, in the judgment of a committee, appointed from the Connecticut State Dental Association, has made a notable contribution to dentistry, science or humanity.

Dr. Ivy Honored: Robert H. Ivy, professor of maxillofacial surgery in the School of Dentistry and the Graduate School of Medicine of the University of Pennsylvania, has been elected to membership in the Imperial German Academy of Natural Sciences. The academy, which was founded in Halle in 1652 and is the oldest existing society of natural sciences in the world, includes among its membership outstanding investigators and teachers in the fields of mathematics, astronomy, physics, geology, botany, zoology, chemistry and various branches of medicine. Other living members of the university faculty who have been honored by election to the Academy are Charles H. Frasier, professor of surgery, and Herman Prinz, professor of pharmacology in the School of Dentistry.

SOUTH DAKOTA

State Society Elects Officers: The new officers elected for the South Dakota State Dental Society at a meeting held in Mitchell, May 7-8, are: president, Glee Tarbell; president-elect, P. L. Scofield; vice-president, G. G. Kimball; secretary, Ernest W. Elmen; treasurer, J. W. King. An innovation at the meeting was the "hobby booth," under the supervision of Carl Anderson, of Mitchell. Many dentists of the state had exhibits of their personal hobbies, which proved of interest to a great number in attendance.

FOREIGN

Overproduction of Dentists and Physicians in Roumania: This situation, according to a dispatch of the International News Service, has resulted in extractions being performed for threepence and a physician's visit costing a shilling. It costs more to have one's hair cut than to have a tooth extracted.

Dr. Orton Honored: Edward J. Orton, of Paris, secretary of the American Dental Society of Europe, has been made a knight of the French Legion of Honor.

Dental Conditions Among the Maoris of New Zealand: T. S. Paget, in an interesting communication written from the Department of Health, Wellington, to the *British Medical Journal,* gives some information respecting the dental conditions prevailing among the aboriginal population of New Zealand. While apparently admitting that the older generation of Maoris had excellent teeth, he says that accurate observation shows a serious deterioration taking place among the children attending the schools, the incidence of caries in many districts being higher than in Europeans. This change he attributes to the abandonment of native dietetic customs and methods of cooking, and the substitution of European food habits and preparation. In support of this contention, he quotes the opinion of health workers among the native races that "the nearer a Maori lives to a store the worse will the

children's teeth be." These views may not be either novel or unexpected, but, coming from an authentic source, they are a valuable contribution to the long series of investigations into the causes of the dental disease so well-nigh universal amongst civilized peoples.—*Brit. D. J.*

A Denture Fatality (New Zealand): A matter of grave concern in this and other countries at the present time is the large number of road accidents and fatalities caused by motor cycles and cars. Among the various causes directly responsible for the death of someone of the persons involved, asphyxia produced by the breakage or dislodgment of an artificial denture must be rare, but a verdict to this effect was returned at a recent coroner's inquiry at Swansea into the sequence of a collision between a motor car and pedal cyclist. The medical evidence went to show that the bodily injuries to the latter, who was killed, were slight, but there was a lacerated wound on the chin, four front teeth were driven into the mouth, an upper plate was broken into several pieces, a lower plate was dislodged, and death was due to a blocking of the air passage by these foreign bodies.—*Brit. D. J.*, May 1, 1934.

New Sources of Vitamin C: The vitamin department under the guidance of Prof. B. A. Lavrov of the Institute of Communal Nourishment at Moscow has finished a series of experiments on the sources of vitamin C, which was found in sorrel, black current and pine wood. The institute is preparing jam, preserves and liquors from pine wood. These products have a practical value as prophylactic means to prevent scurvy in the northern regions of Russia and in arctic expeditions.—*J.A.M.A.*, April 21, 1934.

Advertising Dentistry in Germany: The Dental Board of the United Kingdom is not alone in its policy of advertising the need of suffering humanity for the dentist's care and treatment. A Berlin photograph reproduced by the *Daily Telegraph* depicts a young man with a closely bandaged face parading the street, and carrying a large placard advising passers by to "go to the dentist before it is too late." Ignorance, disinclination and lack of means are all suggested causes in this country of the failure to take early advantage of the dentist's services, but in Germany the recent depletion of the professional ranks may have reduced the opportunities for obtaining skilled attention, although the necessity and desirability for urging it are apparently no less there than elsewhere.—*Brit. D. J.*, May 1, 1934.

GENERAL

The International Status of Science: Prof. A. V. Hill, the physiologist, delivered the Huxley Memorial Lecture, taking for his subject the "International Status and Obligations of Science." Professor Hill said that science and learning have for several centuries been regarded by all civilized communities as entitling their followers to immunity from persecution. Science was a common interest of mankind. It transcended the bounds of nationality. If science lost its intellectual honesty and political independence, if it became tied to emotion or the propagation of particular social or economic theories, it would cease to have its general appeal. The coercion of scientific people to certain specified political opinions, as in Russia, Germany or Italy, might lower the standard of scientific honesty. Scientific men and scholars had been persecuted or dismissed from Germany for reasons of race or for independence of opinion. If there was one single idea that by common consent represents the contribution of England to the common welfare of the world, that idea was freedom. The American commonwealth was founded by English people on the same idea. Professor Hill had wanted closer cooperation with Germany in science, but this was rendered impossible by her offending against the fundamental rule of freedom of thought and research. It might have seemed impossible that, in a highly civilized country, reasons of race, creed or opinion could lead to the drastic elimination of a large number of the most eminent men of science, many of them of the highest standing, good citizens, good human beings. Freedom itself was again at stake. Would man ultimately destroy in his folly

all that he has built up? Professor Hill thinks that the only hope is the cooperation of intelligent people of good will in the various countries. The pterodactyl's achievements in aviation did not save it from extinction; it had some fundamental unfitness. Man's amazing achievements in controlling the forces of nature might be neutralized by combination of the intellect and the passions. Professor Hill thinks that the hope of the future lies in friendly rivalry and cooperation of Britain with the United States.—*J.A.M.A.*, April 21, 1934.

Dentistry Urged as Factor in Physical Examinations: Dentistry and its value to life insurance companies is a subject that has been given considerable attention by M. D. Gibbs, D.D.S., of Hot Springs National Park, Ark. He has discussed the question before several insurance and other groups from the standpoint of the importance of a thorough dental investigation in connection with the physical examination required of life insurance applicants. Declaring that dentistry, according to modern scientific knowledge, is regarded as an important department in the program for the prevention and treatment of many physical disorders, he argues that, while companies accept applicants regardless of dental infection, to begin now with dental investigations would not mean more rejections, but insistence on correction of the disorders would result in building better risks in each age classification.—*The Insurance Field*, May 25, 1934.

Deaths

Carroll, Delia Dixon, Raleigh, North Carolina; died, May 16; aged 62.

Faun, Charles M., Gary, Ind.; Indiana University School of Dentistry, 1924; died, April 19, 1934.

Fisher, Edward M., Columbus, Ohio; Ohio State University, Dental Department, 1898; died, March 14; aged 66.

Peterson, C. W., Moline, Ill.; Chicago College of Dental Surgery, 1906; died of a heart attack while attempting to rescue a drowning woman.

Thompson, Curtis O., Vassar, Mich.; University of Michigan Dental School, 1925; died, April 10; aged 39.

Watson, Harry D., Grand Rapids, Mich.; University of Michigan 1897; died, April 3; aged 60.

MISCELLANY

BOOK REVIEW

New and Nonofficial Remedies, 1934. Containing descriptions of the articles which stood accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1934. Cloth. Price, postpaid, $1.50. 510 pp. Published in Chicago by the American Medical Association.

New and Nonofficial Remedies, 1934, is the outstanding publication of the Council on Pharmacy and Chemistry of the American Medical Association. The first volume of New and Nonofficial Remedies was published in 1907, the present volume thus representing the twenty-seventh annual revision. It contains those proprietary articles which stood acceptable to the Council, Jan. 1, 1934.

New and Nonofficial Remedies at this time has a particular interest to dentists because it is the volume of the Council on Pharmacy and Chemistry on which the projected book Accepted Dental Remedies of the Council on Dental Therapeutics is based.

The book contains the rules of the Council and explanatory comments thereon. These have been formulated and revised from time to time, as the interests and the experience of the Council broadened. Of particular interest is Rule 11, by which the Council refuses to consider any product for admission to N.N.R. if the majority of pharmaceuticals put out by the sponsors are not in the interests of rational medicine. The application of this rule is encouraging some manufacturers to throw overboard

many of the "old reliables." Thus medicine and the public benefits. A number of helpful indices and a list of references to articles which have not been included in New and Nonofficial Remedies, generally because of conflict with the rules, are also included.

A glance over the last reveals interesting facts for the members of the dental profession, since many of these products not accepted by that Council are still being advertised in dental journals or detailed to the dental profession as "ethical proprietaries." For example, ziratol, said to be contained in Ipana tooth paste; Thymo Borine; Super D cod liver oil; Subidin; Styptysate; Sedormid; Sedobrol; Sal Hepatica; Pineoleum; Pheno-Isolin; Peralga; Oxylin; Myodine; Mucal powder; Mallophene; Lavoris; Kolynos; Hexol; Gan-Aiden; Fleischmann's Yeast; D.C.P. 340; Lilly's dental solution; Caroid; Campho-Phenique; Borocaine; BiSoDol; Atomidine; Aspirin Bayer; Allonal-Roche; Alcresta dental lotion-Lilly; acriviolet and others.

Of particular interest to dentists is the inclusion of anesthetics, among which are some of the newer local anesthetics that stand accepted by the Council on Pharmacy and Chemistry: the arsenic compounds, bismuth compounds, barbital compounds, calcium compounds, medicinal foods and others.

Each article admitted to New and Nonofficial Remedies is, so to speak, on trial. An article is accepted for a period of three years, or for as long during that period as it complies with the rules. Examination of the advertising and the market supply of the accepted products is undertaken from time to time. Where necessary or desirable, the members of the Council, who themselves are authorities in their respective field, invite outside consultants. In looking over the list of consultants, it should be of some interest to the dental profession to learn that members of the Council on Dental Therapeutics have been called on for assistance.

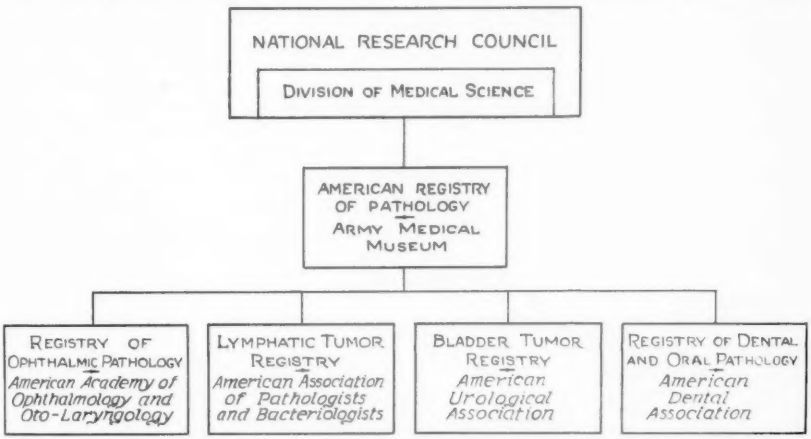
NATIONAL RESEARCH COUNCIL
DIVISION OF MEDICAL SCIENCE
AMERICAN REGISTRY OF PATHOLOGY
ARMY MEDICAL MUSEUM
REGISTRY OF OPHTHALMIC PATHOLOGY
American Academy of Ophthalmology and Oto-Laryngology
LYMPHATIC TUMOR REGISTRY
American Association of Pathologists and Bacteriologists
BLADDER TUMOR REGISTRY
American Urological Association
REGISTRY OF DENTAL AND ORAL PATHOLOGY
American Dental Association

Fig. 1.—Four registries located in Army Medical Museum as a part of the American Registry of Pathology, which is under the Division of Medical Science of the National Research Council.

Such a book could not be published without adequate editorial assistance, and a careful review of this volume indicates the extreme care taken in preparing the material.

Members of the dental profession are urged to acquaint themselves with the contents of the book. They will find in it much of interest to them, and, more significantly, they will find in this one book of the Coun-

cil on Pharmacy and Chemistry a goal their own Council of Dental Therapeutics can reach as soon as some of the barriers with which it contends at the present time are removed.

The American Medical Association has rendered a service to the medical profession, the dental profession, pharmaceutic chemistry and the public by its annual and authoritative revisions of New and Nonofficial Remedies. Dentists can render a service to themselves by having the book readily available and using it.

SAMUEL M. GORDON.

THE REGISTRY OF DENTAL AND ORAL PATHOLOGY

As early as 1895, the importance of scientific dental research was officially recognized by the founders of the American Dental Association. In that year, the national convention expressed itself on this subject as follows:

"Resolved, that this Association formally adopt the Army Medical Museum and Library as the national museum and library of the dental profession of the United States."

During the succeeding years, the Mu-

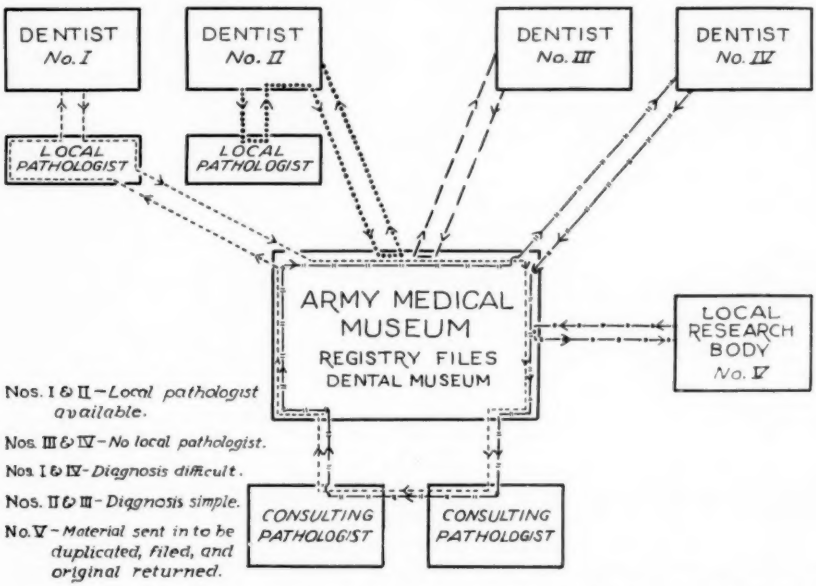
DENTIST No. I
DENTIST No. II
DENTIST No. III
DENTIST No. IV
LOCAL PATHOLOGIST
LOCAL PATHOLOGIST
ARMY MEDICAL MUSEUM
REGISTRY FILES
DENTAL MUSEUM
LOCAL RESEARCH BODY No. V
Nos. I & II – Local pathologist available.
Nos. III & IV – No local pathologist.
Nos. I & IV – Diagnosis difficult.
Nos. II & III – Diagnosis simple.
No. V – Material sent in to be duplicated, filed, and original returned.
CONSULTING PATHOLOGIST
CONSULTING PATHOLOGIST

Fig. 2.—Consultation service offered by the Registry of Dental and Oral Pathology, and method of obtaining material and data for registry files. For example, dentist No. I, with a local pathologist available, has a difficult case and desires consultation for diagnosis. He sends material to the local pathologist and requests him to use the consultation service. The material is routed through the service and the opinions of several pathologists are sent to the local pathologist. Data are extracted for registry files while material is in the museum. Dentist II, with a local pathologist available, has an easy case to diagnose. The pathologist returns his diagnosis to the dentist, who then sends data and material in to the registry files. Dentists Nos. III and IV, with no local pathologist available, send all material direct to the registry for diagnosis and files. Group V is an organization which contributes duplicate data and slides to the registry for its files.

seum Committee of the A.D.A. and a few interested persons collected at the Museum a fairly representative but limited exhibit of historic instruments, models and specimens, together with data on scientific methods. Some detailed studies have been conducted and, in recent years, several exhibits presented at various state and national meetings have aroused the active interest of the Association in this project.

In 1933, at the annual convention of the Association, in Chicago, a resolution was adopted establishing a registry of dental and oral pathology. The registry was placed under the direction of the Committee on the National Museum of Dentistry.

This action was taken with the approval of the Division of Medical Sciences of the National Research Council, which had already established the American registry of pathology at the Army Medical Museum. Therefore, the registry of dental and oral pathology becomes an integral part of this registry of pathology, together with the already functioning units, namely, the registry of ophthalmic pathology, the lymphatic tumor registry and the bladder tumor registry.

The Museum Committee intends to conduct this project along the following general lines:

1. To organize a division of the registry for each branch of dentistry that will benefit by such a service.

2. To collect material from, and compile data appertaining to, the pathologic disturbances of the hard and soft tissues of the oral cavity. A file will be kept of all such material, including gross and microscopic specimens, photographs, roentgenograms and case histories. All cases of definite or suspected malignancy, as well as those of unusual interest, will be followed by annual inquiry addressed to the contributor for a period of five years.

3. To furnish consultation service in the histopathology of difficult cases to any member of the American Dental Association. Each branch of dentistry will be requested to name two outstanding authorities who will serve as consultants in addition to the pathologists on duty at the Army Medical Museum. It is not intended to conduct a diagnostic center in competition with local pathologists as consultation service will be afforded only in such cases as cannot be diagnosed locally.

4. To prepare loan collections consisting of microscopic preparations, photographs or lantern slides of illustrative cases, for use by dental schools, societies and study clubs whose members are affiliated with the American Dental Association.

5. To add to the museum collection so that an exchange service may be maintained for the benefit of institutions interested in museum activities. It is the desire of the committee to enlarge and modernize the dental exhibit so that it will be of interest, educational value and historic record second to none.

There are many exhibits shown at district, state and national meetings which are discarded after they have served their brief purpose. It is intended to obtain the more valuable of these collections for permanent display or file in the Dental Section of the Army Medical Museum. Credit will be given to the donor of each exhibit whenever it is displayed.

Requests for further information relative to the functioning of the registry or concerning the dental section of the museum should be addressed to

The Curator,
Army Medical Museum,
War Department,
Washington, D. C.

Resolution Regarding the Beneficial Circle

The following resolutions were adopted by the Executive Council of the Iowa State Dental Society, May 3, 1934. Similar resolutions were adopted by the Illinois State Dental Society in annual session, May 8-10, 1934:

Whereas, the Journal of the American Dental Association is the official organ of the Association and organized dentistry;

Whereas, the advertising policy of The Journal is conducted on the highest stand-

ard for the benefit and protection of the dental profession and the public;

WHEREAS, the said JOURNAL deserves the wholehearted and substantial support of every member of organized dentistry; and

WHEREAS, the Beneficial Circle Plan was created for the purpose of stimulating interest in and obtaining further financial support for THE JOURNAL, having as its ultimate aim the procurement of additional funds through the sale of legitimate advertising space to be used for the dental education of the public through the Bureau of Public Relations; therefore be it

Resolved, that the Iowa State Dental Society urges its membership to consistently support THE JOURNAL in every way, and use and recommend the products of those firms advertising in THE JOURNAL; be it further

Resolved, that the Iowa State Dental Society records its approval of the Beneficial Circle Plan; and be it further

Resolved, that copies of the resolution be forwarded to the Officers and Trustees of the American Dental Association, to the Editor of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION, and to the Editor of the Iowa State Dental Society for publication in the *Iowa Dental Bulletin.*

CORRESPONDENCE

To the Editor:

Under "correspondence," page 724, of the April, 1934, issue of THE JOURNAL, D. H. Shelling took exception to a list of conclusions which he inferred I had drawn from an article which was published by the October number of the *Journal of Dental Research,* and which was written by Dr. Shelling and D. E. Asher.

He also states: "I do not know of any such contemplated publication, as referred to by Dr. Lennox, in which I am coauthor." Also, "Apparently, Dr. Lennox has been misinformed as to the results of our experiments, and I take this opportunity to correct any erroneous impression in regard to the relation of viosterol to dental caries, which may be gained from Dr. Lennox's reference to our experiments.

I take this opportunity of defending myself for my action in quoting as I did, and to legitimizing my use of Dr. Shelling's name as a reference. If there is any error, then the fault lies not at my door.

The conclusions named are as published in the *Journal of Dental Research,* June, 1931, page 458, and are contained in a series of abstracts from papers in the Scientific Proceedings of the Ninth General Meeting of the International Association for Dental Research, March 21 and 22. In a footnote in the magazine, it is stated: "Most of the abstracts have been prepared by those who presented papers. All revisions have been verified by the authors."

The abstract on which my reference was based is as follows:

THE RELATION OF DIET TO THE TOXICITY OF VIOSTEROL AS A DETERMINING FACTOR IN THE PRODUCTION OF EXPERIMENTAL CARIES IN RATS.

By Henry Klein, D.D.S., Sc.D., Department of Chemical Hygiene and Public Health, Johns Hopkins University, and David Shelling, B.S., M.D., Department of Pediatrics, Harriet Lane Home, John Hopkins Hospital, Baltimore, Maryland.

1. Rats fed diets *high* in calcium and *low* in phosphorus, plus large doses of viosterol (irradiated ergosterol), develop caries of the molar teeth.

2. Rats fed diets *low* in calcium and *high* in phosphorus, plus large doses of viosterol, *do not* develop caries of the molar teeth.

3. Rats fed diets *adequate* in calcium and phosphorus, plus large doses of viosterol, develop caries of the molar teeth.

4. Rats fed diets adequate in calcium and phosphorus, *without* viosterol, *do not* develop caries of the molar teeth. (Italics are in the original.)

Footnote. To be published in the Journal of Dental Research.

If the quoted extract is inexact and does not come in the category of those which were revised by the authors, Drs. Klein and Shelling, or were not prepared by them, I would be glad of correction.

Yours truly,

J. LENNOX,
88-90, St. George's Street,
Cape Town, South Africa.

April 24, 1934.

ANNOUNCEMENTS*

CALENDAR OF MEETINGS

American Dental Association, St. Paul, Minn., August 6-10.

American Academy of Periodontology, St. Paul, Minn., August 2-4.

American Association for Advancement of Oral Diagnosis, St. Paul, Minn., August 6.

American Board of Orthodontia, St. Paul, Minn., August 6-10.

American Congress of Physical Therapy, Philadelphia, Pa., September 10-13.

American Full Denture Society, St. Paul, Minn., August 4-5.

American Public Health Association, Pasadena, Calif., September 3.

American Society for the Promotion of Dentistry for Children, St. Paul, Minn., August 6.

American Society of Oral Surgeons and Exodontists, St. Paul, Minn., August 3-4.

Association of American Women Dentists, St. Paul, Minn., August 6.

International Congress of Radiology, Zurich, Switzerland, July 24-31.

Mid-Southern Postgraduate Dental Clinic, Memphis, Tenn., October 22-24.

Montreal Dental Club Clinic, October 18-20.

New York Dental Centennial, New York City, December 3-7.

Pacific Coast Dental Conference, Long Beach, July 8-12.

Society for Advancement of General Anesthesia in Dentistry, New York City, third Monday in February, April, October and December.

Southern Society of Orthodontists, Hot Springs, Va., July 16-17.

District of Columbia at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

American Dental Assistants Association, St. Paul, Minn., August 6-10.

American Dental Hygienists' Association, St. Paul, Minn., August 6-10.

STATE SOCIETIES

May

Illinois, at Quincy (14-16)

STATE BOARD OF DENTAL EXAMINERS

Arizona, at Flagstaff, July 16-21. R. A. McCall, Secretary, 719 Professional Bldg., Phoenix.

Montana, at Helena, July 9-12. Leonard A. Jenkin, Secretary, Medical Arts Bldg., Great Falls.

North Dakota, at Fargo, July 10-13. R. E. Percy, Secretary, Mandan.

ILLINOIS STATE DENTAL SOCIETY

The seventy-first annual meeting of the Illinois State Dental Society will be held at Quincy, May 14-16, 1935.

BEN H. SHERRARD, *Secretary*,
300 Rock Island Bank Bldg.,
Rock Island, Ill.

NORTH DAKOTA BOARD OF DENTAL EXAMINERS

The next meeting of the North Dakota State Board of Dental Examiners will be held, July 10-13, at the Gardner Hotel, Fargo. Applications with necessary fee must be in the hands of the secretary at least ten days prior to date of examination. Address all communications to

R. E. PERCY, *Secretary*,
Mandan.

SWINDLER

Members of the A.D.A. are warned against the sales efforts of a man sometimes giving the name F. E. Nicholson and offering for sale a product "Sanipack," at $3.06 for two jars. Mail addressed to the supposed manufacturer in Rochester, N. Y., was returned marked "Not known." The product is said by one victim to contain acetone and chloroform, and to be "successful in removing all mucous membrane."

*Announcements must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

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1933-1934

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Marcus L. Ward, '35.....1308 Cambridge Road, Ann Arbor, Mich.
Albert W. Crosby, '34.....215 Whitney Ave., New Haven, Conn.
C. E. Rudolph, '34.....905 Metropolitan Bank Bldg., Minneapolis, Minn.
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George B. Winter, '34.....Frisco Bldg., St. Louis, Mo.

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